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Developing strategic information system planning model in Libya organisations

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Abstract

This quantitative research study investigated the impact of organisational context on the process and success of strategic IS planning (SISP) in post-implementation information systems in Libyan organisations. A set of direct and indirect relationships were investigated in the research model. The organisational context presented as a contingent situational variable mediated by SISP process and predicted by SISP success (the criterion variable). The causality of the relationship set was developed from the contingency theory of information systems and supported by fit models in strategic management research. The study deployed multivariate analysis represented in the structural equation modelling (SEM) to develop robust construct measurements and analyse data collected from executives responsible for information systems planning in both public and private Libyan organisations. Multi-dimensional multi-items constructs were used in the path analysis model after they were extensively validated.

The path analysis model represented as mediation model, where hypothesise suggest that SISP context has an impact SISP success, through the influence of the SISP process. In the model, four dimensions of the SISP context construct were found to have a significant impact on SISP success directly and indirectly through the SISP process. Two of these dimensions are components of the leadership orientation construct, namely "*Creative and Controlling*" leadership. The other two dimensions are "*Organisation centralisation structure and the Riskiness of organisation strategies*". The environmental uncertainty and planning resource constructs were found to have no impact on SISP success in Libyan organisations. Furthermore, this study validated six out of seven dimensions of SISP process construct measurement; only five exhibited acceptable fit level in the path analysis model and all were affected by the SISP context. However, just three out of five SISP process constructs had an impact on SISP success namely "*Comprehensiveness, Focus and Intuition* planning process".

Different SISP processes were associated with different levels of SISP success, "*Intuition*" was the most effective SISP process approach. The second most effective SISP process approach was the "*Focus on innovation*", followed by "*Limited comprehensiveness*". The SISP success measured by the fulfilment of key objectives that has three measurements constructs namely "*Analysis, Alignment, and Cooperation*". The research suggest that under the effect of organisation context the most successful SISP produced by (CIO, CEO, or top executives) who rely less on personal judgment, focus more on innovation rather than control and limit their comprehensiveness of information systems planning process.

Acknowledgment

In the name of God, Most Gracious, Most Merciful

To my parents,
For a life time of encouragement, Support, and who made it all possible.................

My PhD has been a long journey with ups and downs, challenges and encouragements, sad moments and happy moment, during the past four years the whole worlds witnessed some radical changes and certainly my own little world is not exempt from such change, however if we believe in the philosophy of "the only thing does not change is the change itself" then we would be embracing change rather than resisting it…..It's all about the mind-set, managements, believes and goals, the rest is persistent lifecycle has to endure whether we like it or not. When somebody sheltered under the momentum of PhD project one suddenly starts to look at the world from a different perspective. This creates rather a loop of thinking that perhaps generates skills that is uniquely gained by one who got the valour to take up the PhD challenge. It is the maturity of thinking that supposed to distinguish a PhD candidate, represented in the capability to construct value added systematic and approvable piece of knowledge.

I would like to thank my supervisors for the valuable insights and encouragement. Many thanks also to those who additionally participated in the questionnaires and whom provided their insight and years of experience to the study. I would like also to thank Plymouth University for granting me with all the facilities that have helped to carry out the project, and my sponsor who has always been helpful and never hesitated to help. I wish to thank my beloved country Libya and the government for giving me this life time opportunity and funded my study all the way through. To my parents' thank you for the encouragement and support throughout the years, especial thanks to my wife for her support also thank to my brother and my two sisters.

I would humbly thank many friends who have encouraged me and continually offered their friendship over the years

For you all, Thank you……… Esam Osman 2012

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Introduction & Background

1. Introduction

This chapter provides an introduction and background to the research, focusing on different issues that are considered to be important for an overall understanding of the thesis. The chapter starts by discussing the background and justification of the research; throughout the chapter there is an emphasis on the research problems, objectives and questions, finally, the research's theoretical proposition and contribution.

1.1 Research background

For a long time, the association between information systems and corporate strategy was not of much of interest to decision makers within an organisation. Information systems (IS) were thought to be synonymous with data processing, and were therefore considered to support routine operational activities (Rockart, 1979). In the 1980s and '90s, however, there was an increasing demand to address information systems as strategic assets to an organisation. Thus, strategic information systems planning (SISP) emerged. According to Ward et al. (1990), the evolution of strategic information systems occurred through a 'three-era model', as shown in Table (1).

Table 1: The three Era modelof IS (Ward, 1990).

Era	IT/IS	Characteristics
60s	Data Processing (DP)	Standalone computers, remote from users, cost reduction function.
70s &80s	Management Information Systems (MIS)	Distributed process, interconnected, regulated by management service, supporting the business, user driven.
80s &90s	Strategic Information Systems (SIS)	Networked, integrated systems, available and supportive to users, relate to business strategy, enable the business -business driven.

Although some degree of planning for computer-based applications exists in all of the areas listed above, the degree of planning depends on the needs of these models according to their contribution to and integration into the business process. A portfolio model derived from McFarlan (1984) considers the contribution of IS/information technology (IT) in fulfilling current and future business need. Based on this model, computer-based applications can be divided into four categories, as shown in Table (2).

Table 2: Four categories of computer-based applications (McFarlan, 1984).

Support	Turnaround
(Applications that improve management and performance but are not critical to the business. Examples: time recording, payroll, etc.)	(Applications that may be of future strategic importance. Examples: electronic data interchange with wholesalers, electronic mail, etc.)
Factory	**Strategic**
(Applications those are critical to sustaining existing business. Examples: employee database, maintenance scheduling, etc.)	(Applications those are critical for future success. Examples: computer-integrated manufacturing, links to suppliers, etc.)

To compete in a highly dynamic marketplace, firms must frequently adapt and align their competitive strategies and information systems (Tim *et al.*, 2011). Improving the strategic fit of a firm's information systems has been a primary goal of IS executives for at least two decades (Luftman & Ben-Zvi, 2010). Strategic information systems planning research is derived from strategic planning in management research. Understanding of business needs, objectives, priorities and authorisation for information systems projects all needed to be recognised in such plans (Battaglia, 1991). Organisations plan for new information systems to become more competitive in the marketplace; through such planning, they strive to align their business strategy with IS strategy (Henry *et al.*, 2008). The implementation of successful information systems requires careful consideration of systems objectives: If an information system is not positioned strategically to improve organisational activities both the short and long run, there may be extensive waste of time, money and effort, leading to dissatisfaction with the IS contribution to organisational performance. The role of SISP is to ensure that the plan is seeded correctly in the first attempt and is embedded with a capacity which may later diffuse to benefit overall organisational performance. In the present study, the researcher argues that such SISP is most needed in developing countries.

1.2 Definition of SISP

Traditionally, SISP is defined as the process that defines a portfolio of IS applications that support the organisation's business plans and goals (Lederer & Sethi, 1988). Moreover, Reich and Benbasat (2000) defined SISP as the processes of identifying a portfolio of computer-based applications that will support an organisation's business plan, thus enabling the organisation to align its information systems with its business needs and achieve its business goals (Reich & Benbasat, 2000). From the management perspective, strategic IS planning is an essential element in managing information systems. Through this, organisations establish effective long-term use of IS and ensure their support of organisational objectives. SISP helps managers to establish priorities for the implementation of new applications, the development of policies and procedures for managing the IS function and the organisation of IS services. It also helps to construct information architecture and a wide organisational network to facilitate data and application integration (Jason, 2008). When planning for information systems in an organisation, the missions and objectives of such an organisation must be identified by asking questions as a step toward formulating an information systems plan. Questions that can be asked have to do with why business activities need information systems: What information systems do business activities require? When do business activities need information systems? How will they add value to the business units and overall business performance (Porter & Millar, 1985)? SISP is a critical business process that enhances the fulfilment of an organisation's business goals through the use of cross-functional IS (Pakorn, 2007), and has maximum relevance in practice (Teubner, 2007). It consists of strategic management, including the use of the functions and features of IT (Noor, 2007).

1.3 SISP and organisation performance

How SISP contributes to organisational performance is perhaps a debatable issue because of the embedded effect of SISP on the overall organisation performance; however, the role of IS as an important asset to organisational performance has been widely recognised. Crouteau and Bergeron (2001) found that an organisation's technological profile contributes to its performance. Moreover, Santhanam and Hartono (2003) suggested that firms with superior IS capability exhibit superior current and sustained firm performance, while King and Hussin (2002) found that business objectives' alignment with information systems related to better organisational performance. Thus, SISP has a significant indirect role in an organisation's overall performance, and is viewed as the first step toward strategically selecting IS which can positively add value and contribute to overall organisational performance.

1.4 Research motivation

Whether an organisation is large or small, in today's business environment, information systems have become a critical component of its value chain; as valuable organisational resources, information systems needed to be planned and positioned properly to improve an organisation's overall performance to the greatest extent possible. From the smallest businesses to multinational corporations, successful use of IT and IS drive fundamental business processes, help businesses cope with increasing marketplace demands and form an essential basis for competitive advantage. Uncertainty in business performance is a challenge information systems management and make the selection of a new IS a critical task (Henry *et al.*, 2008). The importance of SISP has been well documented within the management information systems (MIS) literature and still among the highest ranked issues in MIS research (Terry *et al.*, 2006; Teubner 2007). Philip (2007) argued that 'despite the constant economic upheaval and incessant technological changes, SISP critically important exercise for all organisations'. This view is supported by Lederer *et al.* (2008), who tested SISP alignment models and proposed that in today's ever-changing business environment, alignment of IT with a company's business strategy through SISP is essential for business success. A recent survey carried out by the British Computer Society (BCS, 2009) indicated that the alignment of IS with overall business strategy is the most relevant issue facing top management in today's business environment. The improvement of SISP has been a priority for both CIO's and CEOs since the early 1990s and remains an area that allows complexity to be recognised within an organisation, as it has maximum relevance to practice (Luftman *et al.*, 2006; Teubner 2007). Higher practicality and an understanding of both IS applications and the business context are necessary to align IS with the business strategy to create competitive advantage. Most information systems corporations (Microsoft, Oracle, SAP, HP, IBM, etc.) working in the field of business application design and integration recognise the importance of SISP within the strategic business unit (SBU) and/or overall business performance as an internal value creation enabler.

Moreover, the significance of SISP is increasing dramatically in the developing countries, particularly as a resource for economic growth and the facilitation of institutional services such as health services and state governance (Ngwenyama, 2006). The importance of this study derives from the increased awareness, demand and adoption of new systems, as well as the increased frequency with which legacy systems are updated, as strategic assets to leverage competition in Libyan organisations.

1.5 Research justification

In late 2007, the author conducted a series of exploratory interviews with CEOs and CIOs from top Libyan organisations; this was later followed by a pilot survey. Whereas the initial investigation lacked methodology rigour, it succeeded in establishing initial observations about the decision-making process in Libyan organisations which is used to formulate information systems planning, as well as why these companies follow such a process. Through the interviews, it became clear that some degree of SISP exists in Libyan organisations. The author was able to identify three dominant outcomes of SISP as a procedure to bring about the successful implementation of information systems. In the first outcome, SISP was a total failure, meaning that it could not be implemented. In the second, there was a partial failure of SISP in which considerable goals/objectives of the implemented information systems were neglected or significant undesirable outcomes emerged. Finally, there was successful SISP, where most implemented information systems realised the main goals assigned to them and significant undesirable outcomes were not experienced.

In all cases and categories, some aspects of the organisational context found to be associated with the formulation of SISP, including a clear strategic mission and top managers' background and support. The author used the success items represented in the IS success model by DeLone and McLean (2003) to assess the outcomes; however, given that information systems success is a stage that comes after SISP, the problem that remains is how to ensure successful SISP in the first place, before the implementation stage. There is an indication that a lack of fit between the organisational contexts and decision-making mechanisms would produce weaker information systems planning outcomes, eventually leading to information systems failure. This exploratory study was backed up by a pilot survey in Libyan organisations, which aimed to investigate the relationship among SISP success, the SISP process and the organisational context.

1.6 Statement of the research problems

The following are problems related to SISP research in Libya.

- *No SISP framework fits all organisations:* Most of the existing SISP theories and frameworks are rigid. They are usually based on homogeneous entities, leading to a one-size-fits-all framework. Thus, insufficient priority given to the narrow context and source-technology factors associated with SISP, especially in different environments and in different countries (Walsham, 2006). This argument has to do with standardisation *versus* localisation in information systems planning and implementation, and suggests that a universal SISP solution is unlikely to be successful in multiple locations.
- *There is no clear SISP process pattern that can enable planning success:* The process of identifying strategic information systems has increasingly become an indispensable challenge for both researchers and practitioners; this process has a range of names in management practice; in MIS research it is called an 'SISP process. Improving SISP process practices are a top concern of CEOs and CIOs in many countries. Until recently, it has been one of the most critical issues facing not just top management, but also academic researchers (Segars *et al.*, 2005; Luftman *et al.*, 2006; Stephen 2007; Bechor *et al*,. 2009). From this perspective, however, the crucial aspect of identifying the SISP process has been underemphasised by researchers both in the developed and developing world (Grover, 2005; Dong, 2008).
- *Lack of attention given to SISP in Libyan organisation:* There have been some endeavours to realise the potential benefits of information systems in developing countries; however, studies concerning strategic information systems planning within the context of developing countries have been rare (Avgerou, 2008), and there has been virtually no research on Libyan organisations. Despite the increasing demand for and awareness of information systems, which triggered the financial commitment in Libya organisations, companies are still facing the potential of failing to align information systems with their business strategy. In addition, the lack of attention to SISP could lead to severe consequences, such as making firms financially less valuable and eliminating business opportunities that might evolve out of better IS alignment.

From the three points above, one can articulate the research problem: There is no robust model, approach or method that can incorporate organisations from different contexts into the planning process for information systems in Libya to ensure better success for such information systems planning.

1.7 Linking this research with other studies

This research project positioned within the leading management research. The study focuses on the subject of management information systems in particular that of strategic information systems planning research. Also, it pinpoints related issues such as IS/business objectives alignment, organisation context and its relation to IS planning process, and finally the outcome of IS planning. The alignment concept is considered a relatively new subject to SISP research paradigm, having emerged as a research field in the early 1980s. Studies have shown that there are different barriers and difficulties that emerge throughout SISP (Lederer & Sethi, 1988; Wilson, 1989).

These are diverse and include both managerial and technological factors. Previous studies have indicated that the aims and objectives of SISP are different from one organisation to another (e.g. Galliers, 1987); therefore, there is no one model that can be applied to all organisations. In the same context, Pyburn (1983) observed the linkage between organisational factors and SISP output, and suggested that organisational factors are one way of determining the best approach to use in SISP. In addition to this, Earl (1993) suggested that the SISP success stems from a mixture of the approach used and other relevant factors (Earl, 1993; Lederer & Sethi, 1988). This suggestion was followed by a study on the manufacturing and service industries in 1990 by Harris and Dave (1993), which investigated organisational context variables that have an effect on SISP success. Subsequently, Byrd, Sambamurthy and Zmud (1995) established that organisational context has an influence on the quality of IS outcome plans. Nevertheless, Grover (1999) established a relationship between the planning approaches used in SISP and the effectiveness of the plan. In 2005, they carried out a study which suggests that this ought to be examined further in relation to the organisational context (Segars & Grover, 2005). Moreover, a few other studies have suggested that the success of SISP is determined by the approach used in the planning and the organisational context in conjunction (Warr, 2004). Therefore, SISP should be considered an unstable environment, and the possibilities for leveraging managers' cognitive capabilities in planning this environment should be explored (Palanisamy, 2005). Newkirka (2007) suggested that an SISP process incorporating exhaustiveness and inclusiveness would be more effective under environment uncertainty.

1.8 Research focus

This research focus on theory testing, it builds upon prior SISP studies particularly that of Grover *et al.* (2005), who have profoundly documented the articulated nature and strength of the relationship between variables in the contingency theories concerned with the strategic planning of information systems. Thus, the research investigates the relationships between organisational context, SISP processes and SISP success within Libyan organisations. The contingency theories dominate studies of organisational behaviour, design, performance and management strategy, it suggest which methodologies are effective in what situations and over a certain period of time (Teng *et al.*, 1998). The fundamental principle of the theory suggests that in order to take advantage of organisational opportunities, management must find a proper fit among key variables within the theory (Grover *et al.*, 2005).

1.9 Research questions

The main question in this study is concern to investigate the relationship between organisational context, planning processes, and their impact on SISP success. In order to develop a model for estimating SISP success in Libyan organisations, the final question will be as follows:

- Is the success of SISP dependent upon the combination of, or fit between, the SISP process and SISP context in Libyan organisation, and what organisational context affects such strategic IS planning the most?

In order to investigate the research problems, this study seeks to answer questions that author considers core concerns of the research investigation. These questions are as follows:

- What organisational contexts have the most impact on the SISP process and SISP success?
- What is the relationship between SISP success and the SISP process in Libyan organisations?
- What is the relationship between SISP success and the SISP context of Libyan organisations?
- What is the relation between organisational context and the SISP process?

1.10 Research objectives

Considering that the key objective of SISP is to produce a successful plan for selecting information systems applications that are capable of leveraging competition and adding value to an organisation's overall performance through better IT/business strategy alignment, this research develop a set of objectives to answer the research questions. These objectives are as follows:

- To apply the contingency theory of information systems in order to investigate relationship between SISP context, SISP process and success in Libyan organisations;

- To identify SISP process' stages of growth in the context of Libyan organisations;
- To develop measurements and models to estimate SISP success in Libyan organisations;
- To draw conclusions and recommendations for a better theory of SISP in Libyan organisations.

1.11 Theoretical proposition

The author of this research deploys the contingency theory of information systems to investigate the relationship between strategic information systems context, strategic information systems process and the success of strategic information systems planning. Figure (1) represents the theory through its general contents; however, as this research is a confirmatory rather than exploratory study, it will use the main hypothesis of the effect of relationships in the theory and select construct measurement that effectively tests the theory in the context of Libyan organisations. It will then develop a statistical model to confirm these relationships. This will be explained in details in the literature review and statistical analysis chapters.

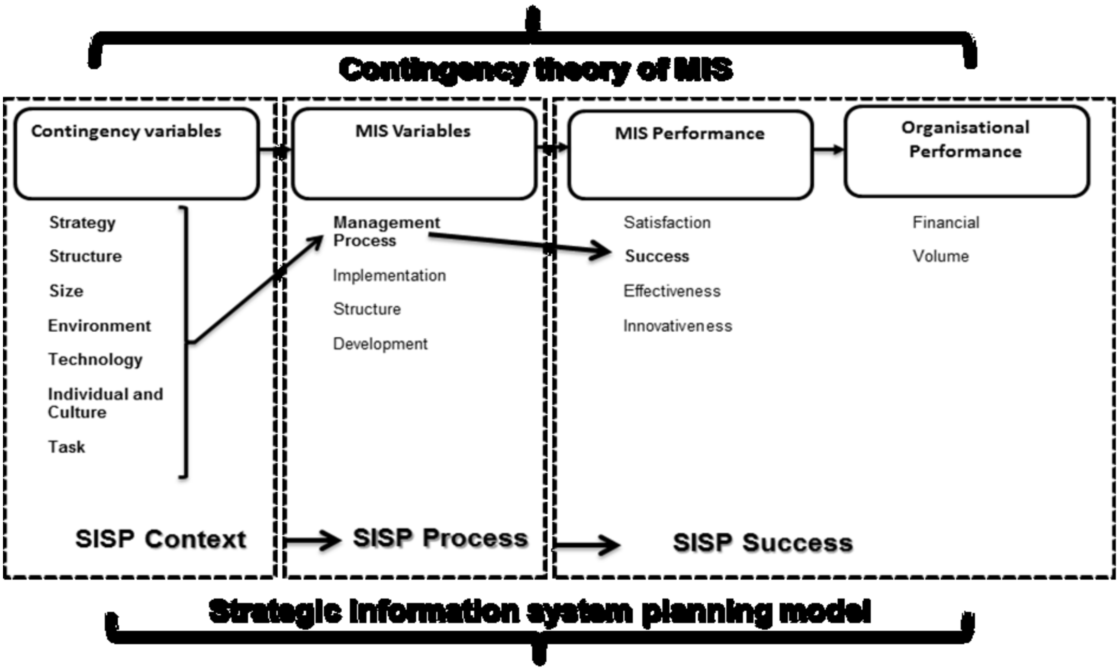

Figure 1: Proposition of SISP contingency model

1.12 Research method overview

The nature of this research is mainly confirmatory. The causality that determines the constructs' relationship directions has been adopted from contingency theory, and refers to the strategic fit model in contingency research (Venkatraman, 1989). The constructs used here were developed and tested using a combination of the construct development methodology and SEM methodology (Bruce *et al.*, 2005; Stacie *et al.*, 2007). Therefore, quantitative analysis is the dominant research method deployed of this study.

1.13 Research contribution

This study contributes to knowledge by empirically testing the contingency theory of SISP in the context of Libyan organisations and developing an estimate model for hypothesis testing. The following points summarise the main contributions of this research:

I) Improved construct measurement of the SISP process through the use and validation of three dimensions, labelled *rationality*, *adaptability*, and *intuition*; the first two dimensions are adopted from Grover (2005), while intuition as the mechanism of the decision-making process has been adopted from strategic management and organisation science literature. This completes the sequence and improves the measurement of the SISP process in developing countries.

II) Identification of the stages of growth in SISP processes in Libyan organisations.

III) Improved concept measurement rigidity through the adoption of more comprehensive measurement items, which are empirically validated in the context of Libyan organisations.

IV) Use and validation of Quinn's (2006) 'competing value framework' as a measurement model to assess leadership orientation and its direct and indirect effects on SISP success.

V) Validating the measurements used in the SISP context in Libyan organisations (leadership orientation, environment uncertainty, organisation strategy and organisation structure), developed from the literature on SISP success.

VI) Relating the suggestions of Drazin and Van de Ven (1985) and Venkatraman (1989) dealing with forms of fit for contingency research and using the model of fit to achieve the research objectives.

VII) Providing insights into how successful SISP is by associating the fit between SISP process and SISP context in Libyan organisations.

VIII) Further validating the construct measure of SISP success developed by Raghunathan and Raghunathan (1994), Henderson (1990), Grove (2005) and Henry and Albert (2007) in Libyan organisations.

1.14 Chapter one summary

This chapter gave the introduction and background for the research thesis. This will form the bases for the next chapters, where the discussion will focus on answering the research questions and meeting the research objectives.

Chapter Two: Literature Review

2. Introduction

This chapter focuses on a literature review of the current and most recent SISP research issues, where the author tries to develop a deep understanding of what constitutes SISP and discusses its benefits. In addition, the chapter highlights gaps within SISP research. The chapter proceeds by linking the role of IS in developing countries and the important of SISP as a decision-making mechanism that usually considered before IS implementation, as well as how this is related to the success or failure of IS. Furthermore, the literature review focuses on the strategic use of IS and issues related to the alignment between business objectives and information systems. It then formulates a definition of strategic information systems planning and identifies the main participant groups for SISP, along with Sip's contextual factors and stages of growth, with emphasis on strategic planning processes and SISP success as a dependent factor. The last sections outline theories that are used in SISP and identify the framework that will be used in the present research to test the research hypotheses, and finally a conclusion is provided.

2.1 Information systems in developing countries

Strategic information systems planning, or SISP, have been confirmed to be the heart of all information systems planning, contributing to the competitiveness of an organisation (Abdisalam *et al.*, 2011). Thus, the information systems strategy is of central importance to IS practice and research (Daniel *et al.*, 2010). Most organisations consider information systems an essential strategic resource which is able to provide a strategic advantage and improve business performance (Brown, 2004). Due to pressure in the business environment, pressure, today's organisations utilise and integrate of IS, and this has increased the significance of strategic information systems planning (Bechor *et al.*, 2009). The purpose of SISP in today's business environment is to study the organisational needs of information systems, recognise strategic opportunities and construct a plan to address those informational needs. Studies show that there are different barriers and difficulties that arise in SISP (Lederer & Sethi, 1988; Wilson, 1989; Kearns, 2007).

The various difficulties of SISP include both managerial and technological factors; furthermore, research has indicated that SISP aims and objectives are different from one organisation to another (Teubner, 2007). In the same manner, Pyburn (1983) suggested that organisational context is one way of determining the best method (approach/processes) to plan for information systems. Nevertheless, Segars and Grover (1999) established a relationship between the planning processes used in SISP and the effectiveness of the plan, and suggested that the processes ought to be examined further in relation to the organisational context. Moreover, many SISP methodologies focus on the rational and formal aspects of organisational life, such that the complexities of actual organisational circumstances, which are characterised by human behaviour, are ignored by most SISP researchers (Pai, 2003). In addition, top management support of SISP is often weak or absent in SISP study (Kearns, 2006). Moreover, there has been limited research on how a constructive internal environment impacts successful IS planning (Kearns, 2007). As a result, only a few studies have pointed out that the success of SISP is a combination between planning processes and the organisational context (Grover, 2005).

Overall, studies on strategic information systems planning in the context of developing countries are infrequent (Avgerou, 2007). Friedman (2005) suggested that there should be more attention paid to IS research in emerging economies. There had been a debate as to whether IS research is relevant to developing countries (DCs); ultimately, it was determined that such research is relevant (Walsham, 2007; Chrisanthi, 2008). The management of information systems research has always drawn on literature from other related business and management fields; for example, economics and organisational literatures, as well as evidence in the subfield of MIS in developing countries' literatures. This association remains relevant in current SISP research (Geoff, 2007). Thus, studying SISP in developing countries is appropriate, since SISP literature developed from within the organisational management literature (Ward, 2004). As in industrial countries, the implications of IS adoption have a potential positive value throughout all sectors in DCs (Walsham, 2007). However, the implementation of information systems is not always successful. There have been several cases of failure or partial failure across different industries in DCs (Walsham, 2000; Richard, 2002). The challenge remains how to deal with and overcome these problems. The following discussion highlights the role of strategic information systems planning in the failure or success of IS in DCs.

2.2 Success and failure of information systems in developing countries

It is crucial to recognise IS failure or success as a relevant issue in SISP study (Heeks, 2000). A few researchers have investigated the relationship between the failure or success of SISP and the failure or success of IS (Chrisanthi, 2008). SISP can be seen as a process of recognising opportunities to select and implement information systems applications to support the achievement of strategic business objectives (Grover *et al.*, 2005; Newkirka et *al.*, 2003). Thus, strategic information systems planning thought to be the first step toward the implementation of information systems. IS/IT failures are often investigated in IS/IT design and implementation research rather than SISP research (Chrisanthi, 2008). Sauer (1993) suggested that IS should be considered a failure only if the operation is terminated; while Lyytinen and Hirschheim (1987) and Flowers (1996) have identified the following four main types of IS failures:

- Correspondence failure: This occurs when the objectives of new information systems are not met;
- Process failure: This type of failure reflects on the difficulty of developing new IS due to deficiency in the budget and/or time schedule;
- Interaction failure: This type of failure occurs when there is a gap between the skill level of end users and the actual level of IS performance measurement;
- Expectation failure: Here, IS failure is viewed as the inability of an information system to meet its stakeholders' objectives, expectations or values.

Likewise, Heeks (2000) has categorised the failure and success of IS in DCs as follows:

I) The complete failure of an information systems initiative that is never implemented or newly implemented in such a way that it becomes instantly unusable;

II) The limited failure of an initiative, in which the main goals are unfulfilled or there are substantial adverse outcomes; in some cases, only a subsection of initially specified objectives is achieved;

III) The 'sustainability failure' of an initiative which at first succeeds but is written off after a short period of time;

IV) A successful initiative in which major stakeholder groups achieve their major goals and do not experience substantial adverse outcomes.

Heeks (2000) also recognised the gap between professional knowledge, IS systems practice and the actual conditions of organisational practice in DCs. As a result, he argued for socially embedded analyses to recognise the causes and tackle the risks of IS failure. On the other hand, some have argued that IS needs to grow to be sufficiently interconnected with organisational practices and secure the required financial and knowledge resources, as well as political assurance, to progress (Braa, 2004). Nevertheless, the failure to carry out SISP and the lack of senior management support and understanding of information systems planning can cause a loss in opportunities and duplicated efforts (Vedabrata, 2002; Salmela & Lederer, 2000).

2.3 Standardisation *versus* localisation in information systems

It has been argued that universal information systems solutions are likely to be ineffective in different locations, considering the different political, social and strategic planning environments that exist in diverse contexts (Walsham, 2006). Today, business environments are witnessing the development of global information systems; companies seek and adopt practices and measures from different contexts and countries for their information systems (Geoff, 2006). However, a concern has been raised about dissonance between the required homogeneity of these systems to generate competence and comparability and the complexity of imposing the same standards in diverse contexts. For example, in their research on the development of business information systems applications and setting standards in health care organisation's data in DC contexts, Braa and Hedberg (2002) highlighted the dilemma between standardisation and localisation by setting out a hierarchy of standards at different levels in health systems, and provisions in the software for local tailoring to explicit needs (Braa & Hedberg, 2002). A similar work by Thompson (2002) investigated the mechanism of generating IS data in DCs. He found that data are frequently generated manually, which can create problems due to the disparity between the needs of information systems and the local knowledge of the end user who created the data. Both studies have recognised that there is a necessity for better methodologies, approaches or strategic information systems processes which can incorporate business needs and strategy into the created systems.

2.4 The need for SISP adoption in developing countries

There are many studies concerned with the strategic significance of IS in business organisations' competitiveness in the IS literature related to DCs (Jarvenpaa, 1998; Goonatilake *et al.*, 2000; La Rovere, 2000; Munkvold, 2005). Such studies note the significance of information systems in business competitiveness in global markets; there is also an indication of the efforts required to overcome deficiencies in local business contexts to achieve the strategic potential of IS (Chrisanthi, 2008). However, studies on information systems related to business competitiveness are comparatively minor, which indicates that there are considerable long-term gains and possible contributions to the research paradigm (Chrisanthi, 2008). The strategic perspective of IS in DCs tends to be discussed in a wider context, resulting in two areas of literature: The first is concerned with IS as a strategic resource for economic growth, while the second deals with information systems' contribution to the development of social services and organisations, such as health services and e-government (Cecchini, 2003; Ngwenyama *et al.*, 2006; Chrisanthi, 2008).

Questions have arisen about the effectiveness of strategic IS in particular socio-organisational contexts (Madon, 2005; Miscione, 2007). Socio-technical systems theory and similar frameworks are relevant to information systems strategy research, as they provide insights into organisational context and culture issues relating to IS alignment with organisation strategy, which in turn improves organisational effectiveness (Venkatraman, 1989; Palanisamy, 2005). In a study on IS in developing countries, Walsham (2007) suggested that the research looking at DCs has matured in recent years. On the other hand, others have noted that SISP studies have mainly focused on highly developed economies. Thus, few findings related to emerging economies have been reported in the major MIS journals (Roztocki, 2008).

From the above discussion, one can conclude that SISP research in developing countries is rare. The matter of IS success or failure in developing countries is associated with IS/IT design and implementation research. Although the importance of IS as a strategic resource and the implications of effective IS adoption as a high-potential value-added asset across all sectors have been realised, such research tends to examine the wider context of the strategic importance of IS in developing countries. The focus on strategic information systems as enabling pre-implementation processes for effective information systems is still a new field in the research on developing countries. The following discussion will define strategic information systems and relate them to strategic management research, and then focus on the issue of alignment between IS and business strategy. Finally, the main research on SISP will be reviewed.

2.5 Strategic use of information systems

The IS of an organisation comprises the IT infrastructure, data, application systems and human resources (Davis, 2000). The concept of IS combines both technical components and human activities, in addition to the process of managing the lifecycle of organisational information systems practices (Avgerou, 2007). Over the past two decades, IS has witnessed significant growth; a recent article in the *Wall Street Journal* by Worthen (2007) showed that 87% of business leaders trust information systems as a critical resource in their business strategy's success. In order to comprehend strategic information systems, we must first understand the concept of strategy within management studies and as an organisational perspective. In an attempt to classify strategic IS research, Gable (2010) categorised IS strategy research in three main categories, as shown in Table (3).

1- IS for Strategic Decision Making	3- Strategies for IS issues
1.1 Strategic Planning 1.2 Information Planning 1.3 Decision Support (DSS, EIS, GDSS) 3.3 IS Organisation (Inc Outsourcing)	3.1 IS Management 3.2 IS Planning 3.3 IS Organisation (Inc Outsourcing) 3.4 IS Development Methods 3.5 Application Service Provision 3.6 IS Implementation 3.7 IS Evaluation 3.8 IS Adoption
2- Strategic use of IS	
2.1 Alignment of IT and Business 2.2 Lifecycle of an IS for Strategic Use 2.3 IS and Globalization 2.4 E-Commerce 2.5 IS for Competitive Advantage 2.6 IS for Internal Strategic Efficiency 2.7 Knowledge Management Use	

Table 3: classification of strategic information systems research, (Guy gable, 2010)

Moreover, comprehensive research conducted by Daniel *et al.* (2010) reported the following three closely related streams of strategic information systems which have emerged from the literature:

- Using IS for competitive advantage (Melville *et al.*, 2004; Piccoli, 2005);
- Alignment between information systems strategy and business strategy (Chan *et al.*, 1997; Chan & Reich, 2007; Henderson & Venkatraman, 1999);
- Strategic information systems planning (SISP) (Galliers 1991, 2004; Premkumar & King, 1994; Ward & Peppard, 2002).

Each of these three streams continues to be important for both practitioners and academics (Luftman & Kempaiah, 2008). In academic research, studies on these factors have commonly centred on a key concept, specifically information systems strategy.

2.6 Using information systems for competitive advantage

Research into strategic management has exposed various dimensions that constitute the strategy construct from different angles (Cummings & Wilson, 2003). Defining strategy and distinguishing different characteristics of strategic decisions processes at different organisational levels have received less attention. Distinct dimensions of strategic management research will be outlined in the following discussion. The first dimension focuses on the central question of what the strategy is (Andrews, 1980; Mintzberg, 1987; Porter, 1996) or what constitutes a strategy (Fahey & Christensen, 1986; Hambrick & Fredrickson, 2001). To date, no model has resulted in a comprehensive consensus on the definition of strategy in management research (Daniel *et al*,.

2010), but there are several strategy models, including Porter's five forces (Porter, 1980), Porter's generic competitive strategies (PGCS), the value chain model(Porter, 1985), core competency theory (Prahalad & Hamel, 1990), the resource-based view of the firm (Barney, 1991b) and other models and tools that support the analysis, development and execution of strategy (Hambrick & Fredrickson, 2001). While each of these tools reflects a useful perspective on strategy, they do not provide a clear, direct definition of the term (Daniel *et al.*, 2010).

The second dimension emphasises characteristics that distinguish strategic decisions from tactical or nonstrategic decisions. The main characteristic is that of the long-term and goal-oriented nature of strategic decisions, which often affect long-term business performance and provide guidance on non-strategic decisions (Ackoff, 1970; Ansoff, 1965; Grant, 2005; Hickson *et al.*, 1990; Johnson *et al.*, 2005; Wheelen & Hunger, 2006). Like the first dimension of strategic management research, this does not offer a rigid definition of strategy.

The third dimension focuses on the strategy at different organisational levels (the corporate level, business unit strategy and operational level) (Vancil & Lorange, 1975; Varadarajan & Clark, 1994). For instance, at the corporate level, strategy involves concerns with the overall business direction (Porter, 1987). This is a major area of interest for a wide range of researchers (Bowman & Helfat, 2001; Grant, 2005; Vancil & Lorange, 1975). Business unit strategy research has mainly been concerned with business differentiation and how to create a core competitive advantage in the current marketplace (Bowman & Helfat, 2001; Grant, 2005). This type of strategy refers to as a competitive strategy (Porter, 1987). At the operational level, functional/operational strategy is mainly concerned with resource allocations to strengthen resource productivity, effectiveness and efficiency (Wheelen & Hunger, 2006). While strategy may include various decisions at different organisational levels, strategy is nevertheless recognised to be more than the sum of the strategic decisions it includes (Rumelt *et al.*, 1994). In this sense, Lorange and Vancil (1977) consider strategy to be the 'conceptual glue' that ensures coherence between individual strategic decisions. However, whether this form of integration is achieved ex ante[1] (i.e. through planning) or ex post[2] (i.e. emergent) has remained a point of debate (Mintzberg, 1990).

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[1] A term that refers to future events, such as the future returns or prospects of a company. Using ex-ante analysis helps to give an idea of future movements in price or the future impact of a newly implemented policy.
[2] Ex post is the opposite of ex ante; it means 'after the event'.

2.7 The five P's of strategy

The above discussion suggests that the concept of strategy is loose and ambiguous. To define the concept with more rigour, Mintzberg (1987) proposed the well-known five Ps of strategy. Strategy can be defined as follows:

- A plan (i.e. some sort of deliberately intended course of action);
- A ploy (i.e. specific manoeuvres intended to outperform a competitor);
- A pattern (i.e. stream of comprehended actions);
- A position (i.e. a fit between an organisation strategy and the external environment);
- A perspective (i.e. the view that unites organisational members; the content of such a view consists not only of a rigid position, but also of an embedded way of perceiving the world).

Each of these characteristics has its own stance; they define strategy through their interrelation (Mintzberg, 1987). For example, a future plan (including ploy) reflects the means to achieve the strategy; however, it does not provide the outcomes (Liddell Hart, 1967; Steiner, 1979). In addition, an examination of patterns of various decisions will not have much rigid strategic value, as this will not provide guidance for future strategy content, and therefore is not actually a strategy (Andrews, 1980). Likewise, the position allows an organisation to understand it is position in the marketplace, but does not provide guidance for its future direction (Porter, 1996; Treacy & Wiersema, 1994). In attempting to find a solid ground to define strategy, Daniel *et al.* (2010) accepted perspective as the best viewpoint from which to define strategy; here, strategy is seen as a shared organisational perspective on setting and meeting organisational goals. Mintzberg (1987), summarises the benefit of the perspective concept of strategy as follows: 'Perspective has one important implication, namely, that all strategies are abstractions which exist only in the minds of interested parties—those who pursue them, are influenced by that pursuit, or care to observe others doing so. It is essential to remember that no-one has ever seen a strategy or touched one; every strategy is an invention, a figment of someone's imagination, whether conceived of as intentions to regulate behaviour before it takes place or inferred as patterns to describe behaviour that has already occurred' (p. 16). Thus, seeing strategy as a perspective resolves the two contradictory views (i.e., intentional *versus* emergent) of strategy, signifying that strategy replicates the collective mind of all the organisational members through their intentions and/or by their behaviour. This definition indicates that a perspective is the most long-term view of strategy (Mintzberg, 1987, Daniel *et al.*, 2010).

2.8 Defining information systems strategy

Most studies on IS strategies originate from and refer to the literature on strategic management (Daniel *et al.*, 2010). Unlike strategic management research, IS strategies research remains ambiguous to a great extent; this is due to the absence of an established structure and solid theoretical foundation, such as those found within business strategy literature. Furthermore, it seems that even scholars are not in consensus in terms of finding one single terminology to name refer to the strategic use of IS; rather, a range of terms is used to represent similar constructs, such as IT strategy (Gottschalk, 1999b), IS/IT strategy (Chan *et al.*, 1997), IS strategy (Galliers, 1991) or information strategy (Smits *et al.*, 1997); the different terms are represented in Table (4). The ambiguous stance of the terms used to define the strategic use of IS creates confusion among researchers trying to interpret existing works (Allen & Wilson, 1996; Daniel *et al.*, 2010).

Table 4: different terminology named after the strategic use of information systems.

Term used	Definition	Source
Information management Strategy	Deals with management of the whole IS function, the management framework that direct how an organisation should run IS/IT activities.	Ragu-Nathan et al. 2001 (p. 269)
Information plan	The outputs of the SISP process	Brown 2004
Information strategy	A complex of implicit or explicit visions, goals, guidelines and plans with respect to the supply and the demand of formal information in an organisation, sanctioned by management, intended to support the objectives of the organisation in the long run, while being able to adjust to the environment	Smits et al. 1997 (p. 131)
Information systems(s) strategy	A term that is used to support or shape an organisation's competitive strategy, its plan for gaining and maintaining competitive advantage	Galliers 1991 Chan and Huff 1992 (p.191), Tai and Phelps 2000, Melville et al,. 2004
IS strategic plan	Used synonymously with IS strategy	Bajjaly 1998
IT Strategy	Developing a plan comprised of projects for the application of IT to assist an organisation in realizing its goals and sustaining competitive advantage using IT	Gottschalk 1999a (p.78); Gottschalk 1999b (p. 115), Lederer and Sethi 1996 Melville et al,. 2004, Tai and Phelps, 2000.
Long-range IS planning Document	An IS plan that considers three or more years into the future and involves the development of IS objectives and the implementation of strategies and policies to achieve these objectives	Conrath et al. 1992 (p. 367)
MIS plan	The observable outcome of strategic IS planning	Pyburn 1983 (p. 3)

As stated previously, information systems represents a broad concept (covering IT, human and management process aspects within the organisation); therefore, the author finds it more meaningful to use the term strategic information systems plan (SISP) to describe the strategic use of information systems. Referring to Mintzberg's (1987) five Ps of strategy, the author found that the term SISP covers all aspects of strategy characteristics. The term SISP is selected because it embraces rather than excluding the meanings of the other terms used to define the strategic use of information systems. The author suggests that the strategic information systems planning must be carefully differentiated as understood in the SISP literature; however, it cannot be assumed that the existence of IS within an organisation is always the result of IS planning. In addition, while IS strategy is part of a corporate strategy, hypothetically it should not be observed as part of business strategy, but rather as a strategic resource capable of adding value to the core competencies of an organisation. Moreover, IS strategy can be a collection of actions: Recent research by Oh and Pinsonneault (2007) examined the pattern of IS deployment as an indication of IS strategy. However, in the SISP literature, the author found that the most explicit pattern is that of stages of growth in SISP processes (Grover, 2005).

While positioning in strategic management means finding a fit between an organisation's strategy and its external environment, positioning in strategic IS means matching IS application and business operations to achieve better IS-business alignment and leverage performance. Due to the increasing importance of IS to organisational activities, understanding the strategic value of IS allows its position to be perceived not just as a passive component of organisational excellence to achieve one single objective as defined in the IS strategic alignment literature (e.g. Chan *et al.*, 1997; Holland & Lockett, 1992), but rather a perspective that addresses the scope of the entire organisation's use of information systems (i.e. IS in investment, deployment and management) to improve firm performance (Daniel *et al.*, 2010). This view is consistent with Earl's (1989) suggestion that IS strategy should both sustain and appraise business strategy. The information systems strategy triangle below simplifies and helps to elucidate the importance of IS in an organisation (Pearlson & Saunders, 2010). Here, all of the elements in the triangle should align with and complement each other. The three components of the information systems strategy triangle model are:

1) Business strategy beginning with an objective and followed by a synchronised set of activities to fulfil the objective and set limits on what the business should seek to accomplish;
2) Organisational strategy dealing with aspects such as human resources, marketing strategy, business environment analysis, organisational structure, workflow and processes, and developing a plan that allows collective business objectives to be achieved through systematic planning for the allocation of organisational resources;
3) Information systems strategy, which is the plan an organisation, develops to determine information systems needs and help the organisation to achieve its business and organisational strategy.

Pearlson and Saunders' (2010, p. 23) framework suggests that successful organisations have a dominant business strategy that is set to drive both organisational and IS strategy. Furthermore, information systems strategy can impact and be affected by variations in organisational and business strategies; thus, changes in information systems strategy should correspond to changes in organisational strategy and accommodate the overall business strategy. As a result, SISP should reflect on a combination of means and ends. As a means, IS is crucial tool to achieve organisational objectives; therefore, it must be considered part of the business strategy process in the fulfilment of such objectives; as end, it should be able to help to accomplish objectives that they have already been identified (Reed, 2001, p. 4).

Figure 2: information systems strategy translation.

Galliers (1993) and Allen (1995) argued that the IS strategy has different components. First, it responds to the questions of what IS are needed and where they are most needed to sustain the main objectives or key goals of the organisation. Second, it asks whether the IT strategy—concerned with technology infrastructure—provides a suitable platform for information flow. Third, it raises the issue of whether the information management strategy is concerned with IS value and whether it contributes to organisational competitiveness through the improvement of organisational activities and supporting change management and new strategy implementation. This discussion has demonstrated how SISP relates to business strategy and that it should not be diverted from its original domain of strategic management. In the following discussion, the researcher addresses the main objective of SISP, which is the alignment between IS strategy and business strategy.

2.9 The alignment issue in strategic information systems

The alignment issue in information systems research has long been debated. For example, Piccoli (2008, p. 155) suggested that organisations attain a high degree of fit between the activities of the IS and the strategic direction of an organisation when they achieve strategic alignment between IS strategy and business strategy. Thus, alignment has become one of the top issues for business executives (Gutierrez, Orozco & Serrano, 2009). In order for an organisation to achieve competitive advantage, it is essential to consider IS as part of business planning and vice versa; in this vein, Ward and Peppard (2002) suggested that aligning IS with business strategy is vital to advancing competitive advantage and finding new business opportunities. On the other hand, Telesca (2001) claimed that in order to improve the IS-business alignment, it is essential for IS managers to have a clear view of the business aims, objectives and strategy. Ansoff (1979) suggested that environmental uncertainty has made it more difficult to achieve alignment in standard planning systems. Thus, managers should adopt a planning approach in unstable environments to take advantage of managerial alertness and allow them to take advantage of opportunities (Grover, 2004). The increase in environmental hostility makes it more difficult to align IS strategies with business strategies (Grovera, 2005). Nevertheless, a study by Ingevaldson (2004) stated that the alignment of IS with overall business strategy is not an easy task; senior management must grasp different approaches towards IS and understand the usage of IS in the business.

2.10 SISP's function in empowering IS-business alignment

The above discussion shows that the alignment between IS and business strategy is a central topic in the strategic use of IS in an organisation. In their survey of 62 companies, Sabherwal and Chan (2001) stressed that alignment of IS strategy and business strategy affects a business' overall performance. In the past, McKinsey (1968), recognised that successful strategic IS planning reflects the alignment of information systems with business strategy; Kearns and Lederer (2000) supported this view by suggesting that the degree of alignment between business strategy and SISP is a measure of how companies use IS for competitive advantage. A study by Bacon (1991) on public sectors departments in the UK found that the relation between SISP and business objectives is significant; Bacon reported that in 85% of the cases he studied, SISP was driven by the business goals of the department. Furthermore, Cragg's (2002) study of private sectors in the UK looked at SISP and business alignment in small and medium-sized enterprises (SMEs); Cragg reported that a large proportion of SMEs had attained high levels of SISP and business strategy alignment.

2.11 Factors that make IS alignment with business strategy difficult

CEOs emphasise the competitive advantage of IS, whereas CIOs stress service levels and user satisfaction as their key performance measures (Burns & Szeto, 2000). Therefore, failure in the planning and integrating IS strategy with business strategy is a difficult task. Failure to implement IS can result from the disintegration of the planning process and related practices (Santhanam & Hartono, 2003). Some of the factors that make alignment such a difficult task are as follows:

- Failure of top management to give IS managers the authority to achieve alignment (Lederer & Mendelow, 1989);
- Business managers' misunderstanding of the technology and what it can offers; such managers often do not have the skill to apply the potentials of IS to their business sector;
- Different expectation of IS from IT managers/CIOs and business managers/CEOs, who measure IS strategy outcomes from different perspectives.

Another problem in the alignment of IS and business strategy represented in the failure to translate business goal and objective into an action plan (Teo & Ang, 2001; Santhanam & Hartono, 2003). Likewise, Lutchen (2004), identified an area in which most businesses fail to deliver value through IS, which he called the 'IT delivery gap'. Moreover, Powell (1993) suggested that the key attribute of well-planned information systems is their positive impact on organisational performance. In addition, Lederer and Salmela (1996), King (1988), Venkatraman and Henderson (1993) and Chan (1992) agreed that such a positive effect is indicated when the implemented projects fit an organisation's objectives.

Alignment is not itself a one-time tasking process, but rather an on-going one. King and Teo (1997) suggested that SISP and business strategy alignment should evolve through four different steps: (1) detaching planning from administrative integration, (2) linking planning with chronological integration, (3) two-way linked planning with joint integration and (4) fully integrating IS planning with the business strategy. Alignment of the IS strategy and business strategy is generally considered the key to SISP success (Pai, 2003). SISP alignment will also help to identify new strategic applications and development within information architecture

(Palanisamy, 2005). Furthermore, the alignment of IS planning improves planning capability and the fulfilment of planning objectives (Lin, 2006). Moreover, it enhances CEOs' understanding of the importance of IS, and increases CIOs' understanding of business objectives (Henry, 2007).

2.12 Venkatraman and Henderson's strategic alignment model

There are theories and models addressing strategic IS alignment within an organisation, such as McFarlan's (1983) strategic grid model. However, the well-recognised model of IS/business strategy alignment is that of Venkatraman and Henderson (1993). They claimed that the reason for organisational failure to realise the value of IS investment is often that organisations do not emphasise the alignment between business objectives and IS strategy. This occurs due to the absence of a dynamic SISP process that ensures the consistency of the alignment and fit between the business strategy objectives and IS strategy. Venkatraman and Henderson documented four organisational domains in which choices can be made to impact the degree of IS-business alignment. The four domains can be structured into two sections. First, the business organisation section that includes business strategy, organisational infrastructure and organisational processes. Second, the IT organisation section includes IT strategy, infrastructure and processes.

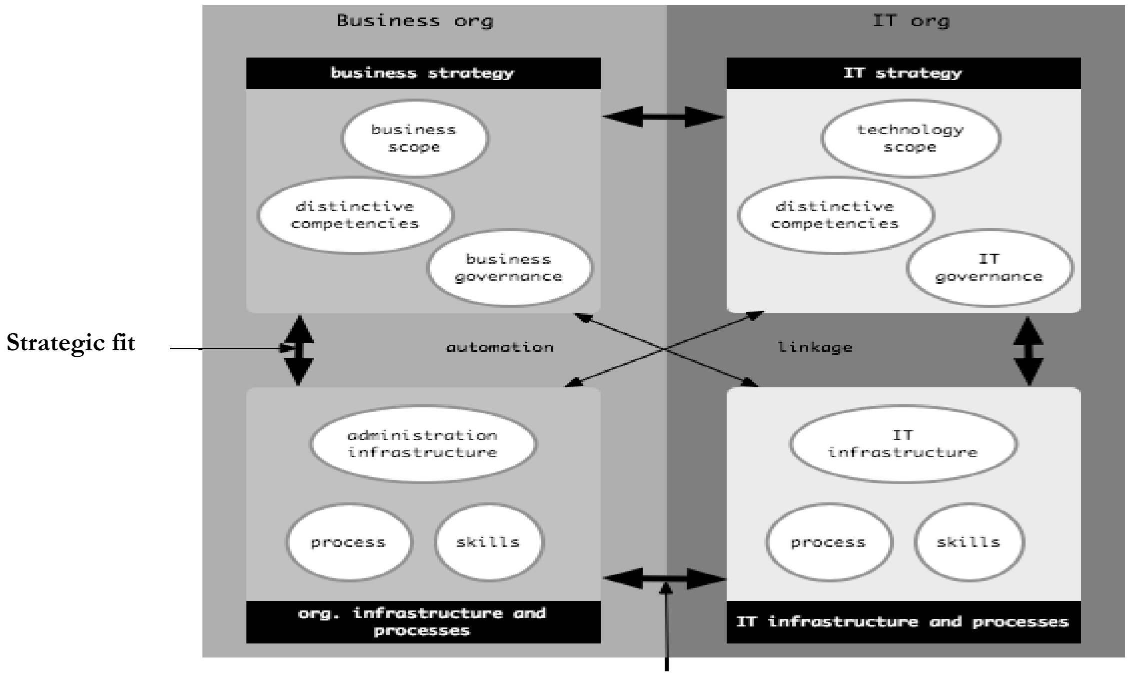


Figure 3: Henderson and Venkatraman (1993), the strategic alignment model.

In the above figure, 'strategic fit' refers to the vertical interrelationships between business strategy and organisational infrastructure and processes, as well as the fit between IT strategy and

IT infrastructure and processes. Meanwhile, 'functional integration' refers to the horizontal integration between business and technology. Thus, change in one domain generates alterations in at least two other domains. According to Venkatraman (1993), there are four principals of alignment stance can be used for analytical purposes to understand how business and IT can 'change' to generate alignment. The following diagram illustrates these perspectives.

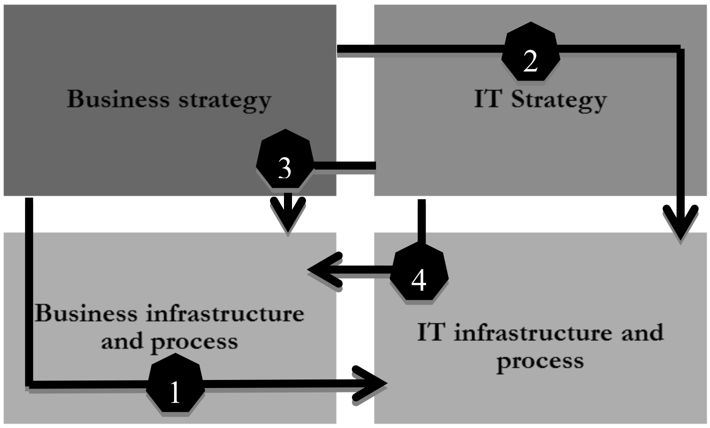


Figure 4: Dominant alignment perspectives in Henderson and Venkatraman (1993) strategic alignment model

1. Strategy execution: This is the most obvious stance, in which business strategy defines organisational infrastructure and design, and organisational design defines the IT infrastructure needed. Business managers make strategy, while IT managers convert such strategy into IT projects. In this perspective the role of the CIO is greater than that of project implementation management and IT management.

2. Technological potential: In this perspective, business strategy is still the driver, but the formulation of IT strategy is involved to support business strategy, along with the requirements of IS infrastructure and the processes required. In this perspective, the CIO is reactive leader. The CEO drives the technological vision with the help of the CIO, and both works to put IT strategy in place to achieve business objectives; the CIO generates a solution according to the business strategy.

3. Competitive potential: This perspective is concerned with exploring new technological opportunities to gain a competitive advantage. The CIO proposes initiatives to develop new products and services or update existing ones, modify the business strategy and alter organisational design and governance. The CIO must be able to drive business change, recognise technology trends and analyse the opportunities and threats/risks involved in adopting this technology. The CEO must demonstrate an understanding of the technological opportunities offered by the CIO and see how to transform the business to exploit new opportunities and gain overall competitive advantage.

4. Service perspective: In this view, information is the main organisation product or service; IS organisations are providers of such products or services. Therefore, this perspective is about the information systems end users; the alignment of information systems and business strategy does not play a significant role.

Business management prioritises IT investments with limited resources, and decides on issues such as outsourcing and partnership arrangements. The role of the CIO is to capitalise on the use of IS in the organisation, in light of operating advice from business executives, to improve business infrastructure and processes. In this perspective, the CIO acts as the business leader. The value of Venkatraman's strategic alignment model is that it clarifies how business/IT alignment can occur inside an organisation. The model can be utilised to achieve a shared understanding between CIOs and CEOs in terms of how strategy can be implemented as architecture and processes. The strategic alignment model is about recognising strategic motivations and infrastructure change. CIOs and CEOs can utilise the strategic alignment model both as an evaluation tool—answering the question of how business/IT alignment occurs in the firm—and as a decision-making tool for organisational change, answering the question of what needs to change in strategic decision making to achieve a better fit with the external business environment. However, strong collaboration and leadership remains key elements when it comes to producing effective and aligned strategic and operational mechanisms.

2.13 Scope of the strategic alignment model

Since the strategic alignment model was introduced by Venkatraman (1993), many scholars have replicated the model and used it as a guide in their own research (Francois *et al.*, 2004; David *et al.*, 2006; Presley, 2006). One interesting study conducted by Hevner *et al.* (2004) used the strategic alignment model to illustrate that effective conversion of strategy into infrastructure design involves broad planning in both business and IS organisational design to create an effective organisational infrastructure and information systems infrastructure. In 'IT does not Matter?', Carr (2003) claimed that IS is a commodity, and since everyone can obtain the same IS artefacts, inefficient artefacts can no longer help an organisation to gain competitive advantage. This argument can be easily understood when, for example, an organisation uses business software and applications from open market vendors (e.g. SAP, MS-Dynamic, Oracle, etc.). In such a case, organisations will not be able to differentiate themselves from the competition because their competitors could use the same business applications. Thus, information systems will become more organisational factors and lose their competitive value. Carr went on to suggest rules to adopting IS strategy by encouraging organisations to focus on vulnerabilities, not opportunities, less investment in IS infrastructure, and a follower rather than leadership strategy. This perspective was criticised by Brown and Hegel (2003), who stressed that 'Extracting value from IS required innovations in business practices. Organisations that mechanically insert IS into their businesses without adjusting their practices for the new IS capabilities will only destroy IS economic value' (Brown and Hegel, 2003).

IT must be evaluated within the organisational context, giving the fact that each organisation has different business practices. There might be limitations in IS-business alignment in terms of deciding on what to change and where; it requires managerial as well as strong leadership skills to initiate, implement and create value in IS. In terms of the design and evaluation of information systems, March and Storey (2008) stated that 'The contributions of new constructs, models, and methods assessed with regard to their capability to improve performance in the development, implementing and use of information systems' (p. 726).

Alignment is a fundamental element of strategic information systems planning research. It has attracted increased interest in recent years; researchers have focused on alignment and demonstrated that it is a rich phenomenon with many motivating and significant issues to evaluate. Every business organisation is unique; therefore, the IS and business strategy should work together to support the specific business objectives. For this to happen, top management in a company must cooperate to recognise the business requirements and identify business objectives, thereby setting information systems and business strategy to support the overall business goals and objectives. Moreover, for an organisation to attain competitive advantage and improve its business performance, it is essential to align the IS plan with the overall business plan, and IS should be implemented in accordance with the resources and the capabilities of the organisation. The following discussion focuses on SISP literature, theories, models and methods.

2.14 The purpose of SISP

SISP is defined as the process of recognising opportunities to select and implement information systems applications to support the achievement of strategic business objectives (Grover *et al.*, 2005, Newkirka et *al.*, 2003). Reich and Benbasat (2000) defined SISP as 'the process of identifying a portfolio of computer-based applications that will support an organisation's business plan, thus enabling the organisation to align its information systems with its business needs and achieve its business goals' (Reich & Benbasat, 2000). In this definition, the term *computer* should be redefined to include software, hardware, telecommunications and networking. Furthermore, it is essential to modernise the definition to comprise current IS management issues and IT infrastructures. From the systems thinking point of view, SISP is defined as 'a vital part of IS management, through it, organisations establish effective long-term use of IS and ensure their support of organizational objectives, this entails establishing priorities for implementation of new applications, developing policies and procedures for managing the IS function and organising IS services, and construction of a global, organisation wide, information architecture to facilitate data and application integration' (Jason, 2008).

The present study adopts the following definition: 'SISP is the process of deciding on IS objectives for an organisation's to utilise and manage information effectively within given contextual factors'; therefore, SISP is a critical business process that will enhance the fulfilment of an organisation's business goals (Pakorn, 2007), as well as its concerns of maximum relevance in practice (Teubner, 2007). SISP consists of strategy from both information planning and business planning, including the use of functions and features of IT (Noor, 2007). Most organisations use forms of IS to conduct their daily operations, resulting in better efficiency and effectiveness; however, management is striving to deploy IS as a way to increase business performance, where there is a definite link between SISP and IS effectiveness (McFarlan, 1971). Research has suggested that the most successful companies are using SISP to overcome the difficulty of extracting value from the deployment of information systems (Luftman & McLean, 2004).

2.15 The main participants in SISP

In a qualitative research of 20 top IS executives, Lederer and Mendelow (1986) found that there were considerable differences in IS objectives within the IS management groups. This view was also supported by Terry *et al* (2007), who found differences among top IS managers, middle IS managers and operating IS managers. Study suggested that even groups of stakeholders are not always in agreement about information systems objectives in their organisation. The view of the information systems management group varied depending upon their managerial level in the organisation (Terry *et al.,* 2007). On the other hand, Moynihan (1990) revealed that IS stakeholder groups are interrelated when it comes to IS issues; the study investigated IS stakeholder in 49 private sector organisations. Moynihan found that the top management group and the user management group shared the same IS concerns, and these were also the concerns of the middle IS management group. However, the information systems user management group faced a set of technical issues that they did not share with top management.

A large study by Ruohonen (1991) involved three case studies using a combination of personal observation and interviews. The study viewed SISP as a political process, and examined the organisational and social relationships among the group responsible for SISP. Within this political group, they identified three different stakeholder groups responsible for SISP, which are the following:

a) The top management group;
b) The user management group;
c) The IS management group.

The study found that each of these stakeholder groups were quite different in their expertise, autonomy, previous experience of IS, and awareness of the potential of IS and their contribution to the organisation. He also found that the relationships among these three stakeholder groups were rather different from one organisation to another.

2.16 Value extracted from SISP

As stated above, the alignment and integration of information systems within an organisation helps to achieve a better competitive advantage and increases organisational performance. SISP can also help to better achieve the value added by information systems. A number of researchers have used different models to examine the level of business-IS integration. The critical success factors (CSFs) by Mendoza *et al.* (2006) is one of these models. These researchers illustrated that there are four levels of IS-business integrations, and these are the following:

Level 1—End-to-end integration: This level involves the launching of basic infrastructure for exchanging information between information systems applications, even without any real business intelligence related to the database and infrastructure.

Level 2—Structural integration: In this form of integration, the organisation uses more advanced middleware tools, including software and hardware, to standardise and regulate information exchange between computer applications.

Level 3—Process integration: In this level, the role of an organisation is to manage the information flow between applications to allocate information where it can be utilised for the benefit of organisational activates and decisions.

Level 4—External integration: In this level, organisations seek external integration by connecting to real-time business applications to attain real-time data to feed its internal applications for better business processes and decisions, as well as seeking new customer-focused processes and redefining the organisational strategy.

The main objective of SISP is to create an IS application that fits the goals and objectives of the organisation (Dhillon, 2005; Turban *et al.*, 2005). SISP helps in the integration of IS, which in return helps organisations to innovate in their business practices (Carr, 2003; Power, 2006; Cash *et al.*, 2008; Silvius, 2008). Some researchers argue that well-integrated information systems are a direct result of organisational innovation (Burgelman *et al.*, 2008). SISP helps to improve and shape business strategy and decision-making by collectively adding competitive value to the IS of an organisation in order to enable information sharing, solution finding, collective support and implementation and resource sharing (Earl, 1996; Ward & Peppard, 2002; Mohdzain *et al.*, 2007; Applegate *et al.*, 2008).

On the other hand, external focus and differentiation are as important a contribution of SISP as internal focus and integration; value-adding partnerships between manufacturers and retailers and global information partnerships are examples of external focus and differentiation (Evans *et al.*, 1999; Dhillon, 2005; Hunter *et al.*, 2006; Saglietto, 2009). SISP value can be classified into three main points: (1) the strategic analysis value, (2) the competitiveness value and (3) the alignment value. Strategic analysis focuses on how organisations relate the contribution of information systems to the core business process, mission and vision (Ward & Peppard, 2002; Shore, 2006; Irani *et al.*, 2005). In contrast, both alignment and competitiveness focus on information systems goals (Applegate *et al.*, 2008; Turban *et al.*, 2005; Laudon & Laudon, 2004; Saglietto, 2009; Mohdzain *et al.*, 2007; Benson *et al.* 2004).

2.17 Contextual factors related to SISP

It could be disputed that all information systems studies are contextual, as they address issues of technological deployment within organisations rather than in a laboratory setting. Thus, information systems research considers SISP research within its environment. However, studies of SISP vary in terms of the following:

- The context of SISP and the organisation that is the subject of the study;
- The definition of the environment considered; and

- The conceptualisation of the SISP process in relation to the environment in which it unfolds.

Since the 1970s, researchers have been trying to appreciate the mutual relationship between IS and organisational change from the strategic business and contextual points of view (Avgerou, 2002). According to Heeks (2000), IS/IT must be viewed within the context of economic, social and resources that assist in utilising the technology for the best outcomes (Heeks, 2000). The impact of context on the SISP is vital; however, the integration of contextual factors has not been made explicit, and some factors have only been superficially examined, as they differ from one environment to another (Jason, 2008).

2.18 Boundaries of the SISP context in the present study

Every action and idea has a context that can be also subject to the moment. SISP exists within a particular organisational context: The organisation builds upon the influence of a specific context. The primary element of SISP context is the environment in which it exists (Chi & Lederer, 2005), including, e.g. the infrastructure, the political and economic situation and the organisational culture with its dimensions, such as education, believes, arts, politics, histories, etc., as well as time and place; thus, context is a very broad concept. In this research, context is restricted to the following:

- Strategic information systems planning in developing countries;
- The environment of the organisational entity in developing countries;
- The strategic use of information systems planning by the main actors and decision makers (CIOs, CEOs);
- A framework that includes the SISP's environment in the evaluation of SISP as processes and outcomes.

Therefore, the SISP context in developing countries has to do with a set of external and internal organisation components. The context and measures of an organisational system are key elements in designing an IS strategy (Brown, 2006). These contexts and procedures are considered to be the enablers or inhibitors for IS–business strategy alignment (Luftman, 2000; Sledgianowski *et al.*, 2005). The following discussion will emphasise each element of SISP context developed from the literature review.

2.19 SISP leadership support and communication

The support of SISP by top management is critical to SISP success. This can be acquired when top management is aware of the strategic values of IS (Ward *et al.*, 2002). Top management's contribution to strategic IS empowers the IS-business strategic alignment (Avison *et al.*, 2003). Hence, the improvement in the working relationship between the CEO and CIO is a crucial factor, since this relationship can form the work-base for a complex planning process (Tai *et al.*, 2000; Laudon *et al.*, 2004; Denford *et al.*, 2009). A survey conducted by Khandelwal (2001) examined how IS objectives are perceived within an organisation; he found that there are different views between CIOs and CEOs within the same organisation. Moreover, Tai and Phelps (2000) argued that the failure of IS projects is the consequence of conflicts between top managers and IS directors. Senior managers responsible for SISP should find a common ground in working together in order to produce effective planning, as poor working communication between the key stakeholders demonstrates that organisations do not value IS planning adequately (Cerpa & Verner, 1998). Differences in backgrounds, interests and priorities are factors that affect the IS-business alignment (Laudon *et al.*, 2004). Thus, the relationship between CIOs and CEOs is fundamental to the success of the SISP (Verner, 1998). Strong communication between CIOs and CEOs is essential to provide CEOs with a better understanding of IS value, so that they will support IS initiatives, including the SISP process. It is also necessary for CIOs to understand the business strategy so that they can work toward the fulfilment of business objectives (Terry *et al.*, 2006).

2.20 Organisational culture and the role of leadership

Organisational culture has been extensively studied over the years, since it is an important factor in supporting organisations to succeed and grow. An understanding of how to build, maintain or modify an organisation's culture is important in achieving competitiveness (McAleese & Hargie, 2004, p. 155). In the literature, several definitions are given of organisational culture. According to Schein (2004), *organisational culture* is a shared system of values, symbols and meanings; it is a pattern of shared prospects produced and manipulated by top management. A simpler way to define organisational culture is as the conditions of people's beliefs, which have a direct influence on the ways in which they behave (Weiling Ke, 2008). The concept of organisational culture has inspired many authors to draw attention to different features of historically created and shared behaviours that involve and reflect on the planning for IS, such as attitude to hierarchy, arranging action in time and sense of space and geography (Sahay, 1998). Less attention to this feature might prevent the development or successful implementation of IS project. Schein (1985) advocated that the essence of culture lies in a set of 'underlying assumptions'. Moreover, Deshpande and Webster (1989) define organisational culture as a 'set of shared assumptions and understanding about organisation functioning' (p. 4). Although organisational culture may be interpreted based on many different perspective and assumptions (Smircich, 1983; Leidner & Kayworth, 2006), despite these differences, there seems to be harmony among scholars in the view that organisational culture comprises several levels with a changing degree of awareness and understanding about organisational functioning on the part of the culture-possessor (Hofstede, 1990; Schein, 1985). According to Schein (1985), there are three different levels of culture possession within an organisation. First, at the surface level, there are artefacts such as the visible and audible patterns of the culture. Second, there is the intermediate level, which covers values and beliefs, as well as concern with what ought to be done. Third is the profound level, at which it is assumed that the organisation's members have no understanding about organisational functioning because the culture is embedded in their behaviour. Terry *et al.* (2006) suggested that an interesting variable research could explore in terms of the effect on SISP would be the organisation's culture as a contingent variable, as the literature indicates that firms that show different corporate cultures tend to utilise different levels and complex strategic planning (Veliyath, 1993). The process of SISP itself is an extension of leadership orientation, as senior management plays a vital role in the management and manipulation of an organisation's culture (McAleese, 2004). Therefore, leadership of senior management is necessary for SISP success (Weiling, 2008). IS leadership is essential for many reasons, some of which are listed in the following:

- Ensuring top management support of IS planning;
- Ensuring the fit between IS and business strategies;
- Supporting communications between different management levels; and
- Shifting user attitudes toward acceptance of information systems (Ward *et al.*, 2002).

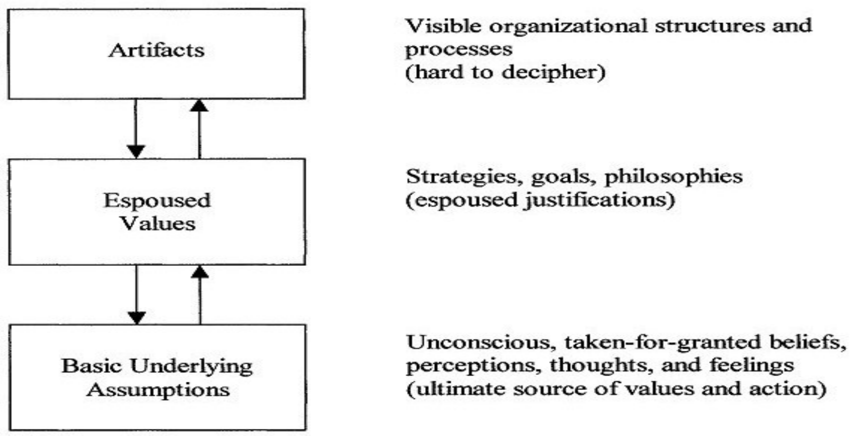


Figure 5: Organisational culture and leadership (Schein, 1985, p. 14).

In this study, SISP is concerned with the leadership of CIOs and the executive IT advisory committee, which includes both CIOs and CEOs. Therefore, this research will focus on the intermediate level of CIOs' and CEOs' values and believes, and an understanding of SISP measures ought to be taken from the perspective of culture. A few quantitative models assess organisational culture, including the organisational culture inventory (Cooke & Rousseau, 1988), competing values model (CVM) (Quinn & Kimberly, 1984), and the Hofstede model (Hofstede, 1990). However, the culture inventory and Hofstede's model are far too complex for this research, as both comprise more than 100 items required to measure organisational culture in general, whereas this research pursues a model that can assess leadership culture rather than organisational culture in general, and therefore CVM has been selected. Other advantages of the CVM over the other two models are stated in the operationalisation chapter. Thus, this research will apply the CVM to assess leadership culture.

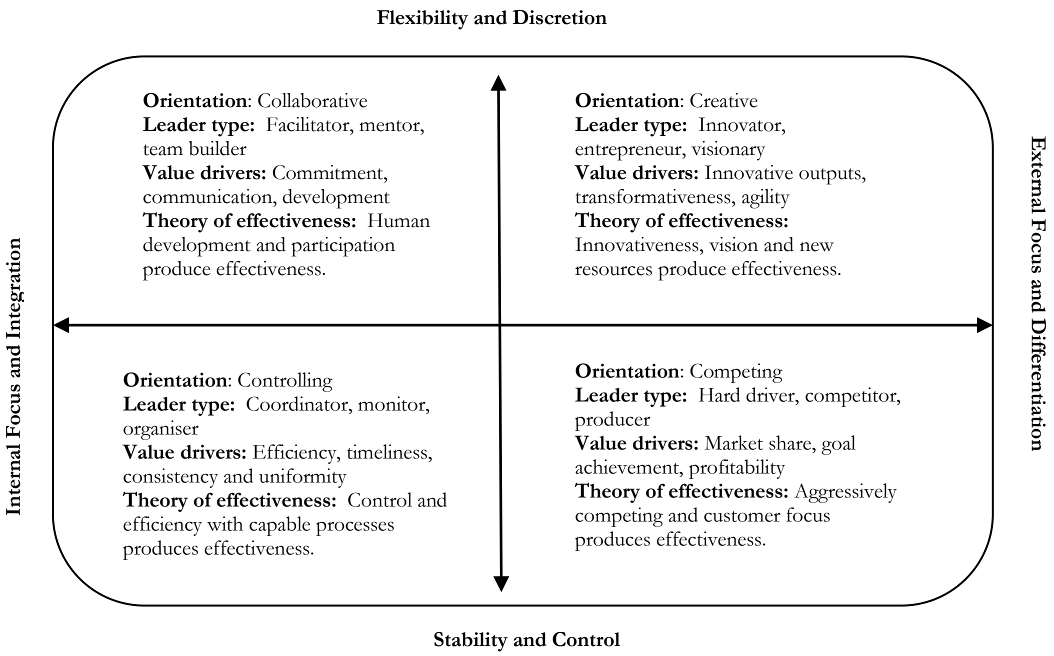


Figure 6: The competing value of leadership, effectiveness and organisational theory (Quinn, 2006, p. 46)

A similar study was carried out by Juhani and Huisman (2007), who explored the association between organisational culture and the arrangement of systems development methodologies; they interpreted organisational culture in terms of the competing values model and deployment as perceptions of the support that has an impact on systems development methodologies. In this study the main motivation for selecting the CVM is that, as a quantitative model of organisational culture, it is well matched with the survey research method selected for this study. Furthermore, it is well represented in the literature, and it has fairly short validated measurement instruments for organisation culture (Denison & Spreitzer, 1991). The lack of integration between organisational culture and the cultural assumptions embedded within an IS negatively affect the implementation of such systems (Hatcher, 1992; Robey, 1999; Romm, 1991; Jung, 1999; Jarvenpaa, 2001). For example, Martinsons and Chong stated, 'even a good technology can be sabotaged if it is perceived to interfere with the established social network' (p. 124; see also Cooper, 1994). When the value of IT clashes with an organisation's culture, the implementation will struggle: Either the system will be rejected or it will be modified so that it matches the existing culture (Weiling, 2008).

2.21 Enterprise architecture

Enterprise architecture (EA) is the exercise of applying a complete and rigorous method to describe the present and future structure and performance of an organisation's IS, so that information systems can align with the organisation's main goals and strategic direction. There are several EA frameworks, such as the Zachman framework, the Department of Defense Architecture Framework (DODAF), federal enterprise architecture (FEA) and others. Understanding the enterprise architecture and frameworks is important to design and develop effective and valuable IS architecture that accommodates all types of business applications and the data architectures needed for business capability (Willcocks *et al.*, 1997; Brown, 2006). Information systems architecture (ISA) is defined as 'a set of high-level models which complements the business plan in IS-related matters and serve as a tool for IS planning and a blueprint for information systems plan implementation' (Willcocks *et al.*, 1997, p. 342). The information systems architecture frameworks should provide the organisation with the technical aspects needed for information systems strategic applications, as it includes the organisation's technology portfolio (Turban *et al.*, 2005). When planning for IS, this understanding can result in a profound difference in how IS and business strategy are aligned (Laudon *et al.*, 2004; Brown, 2006).

EA provides the logic for information systems components such as applications, data and technology infrastructure and where this fits to match the business activities. Management must determine the data, applications and processes and how they can be effectively shared to improve organisational capability (Ross, 2003). The five most common domains of EA and their component are described below.

1) **Business domain:**

- Strategy maps, corporate policies, goals, operating model;
- Functional decompositions: business capabilities and organisational models illustrated as the enterprise line of business architecture (BA);
- Business processes: workflow and rules that articulate the allocated authority, policies and accountabilities;
- Organisation lifecycles: stages and timing; and
- External connections: Links with hardware, software and services providers.

2) **Information technology (IT) domain:**

- Information systems architecture (ISA): a complete general view of the flow of information within an organisation;
- A metadata library including the data that describe enterprise data elements; and
- Data models expressed as enterprise information architectures (EIA), logical and physical data flow.

3) **Business applications domain:**

- Application software and diagrams: illustrated as a theoretical functional model or systems enterprise line of BA; and
- Communication and data sharing between applications, including messages and data flows.

4) **Technology infrastructure domain:**

- Inter-application arbitration software or 'middleware';
- Operating frameworks including operating systems and application execution environments, applications server environments, verification and approval environments, security and monitoring systems;
- Hardware, platforms and hosting servers, including data centres and computer rooms or cloud hosting;
- Networks, including Internet connectivity; and
- Internal, extranet, Internet, e-commerce, electronic data interchange (EDI) links to parties within and outside of the organisation.

5) **Infrastructure software:**

- Application servers, database management systems (DBMS); and
- Programming languages.

2.22 The importance of the organisational environment to SISP

Strategy can be defined as an arrangement of goal-oriented decisions and actions that use organisations' skills and resources while bearing in mind the opportunities and threats in a given environment (Johnson & Scholes, 2002). The external environment is a crucial factor in SISP, as is the internal one. In order to comprehend the value of new IS, planners should critically assess the suitability of such an environment. Thus, environmental assessment (ENVA) can have a great influence on the attainment of SISP goals (Chia & Jones, 2005). The external environmental complexity and uncertainty following by the ever-increasing pressure on IS to improve capabilities has an impact on business structures; new opportunities are emerging, and as a result, the internal environment is constantly shaped and reformed. Simultaneously, competitors are trying to capitalise on this and compete heavily in the marketplace by producing new services and product. Customers are becoming meticulous in their choices of those products and services, and governments putt pressure on businesses by introducing new policies regulating organisations, while suppliers progressively attempt to attain the highest possible prices for their products or services in innovative ways. Therefore, organisations look for flexibility to swiftly adapt to environmental changes and thus gain an advantage over their competitors (Barry, 2000).

In this context, academics have advocated that more extensive planning would add to the success of IS plan, as this would support recognition of the environmental dimension and influence information systems adjustment, enhancing the response to the complexity of the context (Newkirka & Lederer, 2006). Lederer (2006) proposed five main stages in the SISP process, as follows:

- The strategic awareness stage;
- The situation analysis stage;
- The strategy conception stage;
- The strategy formulation stage; and
- The strategy implementation stage.

Nevertheless, the same study by Lederer (2006) suggested that the effectiveness of planning stages depends on the environment in which operate. Newkirka (2003) argues that too little SISP will result in inadequate understanding of the external and internal environment, producing unreasonable strategic alternatives and making their selection difficult. On the other hand, too much SISP will be time-consuming, resulting in missed opportunities.

2.23 Environmental uncertainty

Considering environmental uncertainty is critical for SISP; some researchers have found that such uncertainty leads to less analysis during planning, while others have reported that environmental uncertainty leads to increased planning comprehensiveness and improved alignment with business planning (Cohen, 2008). Investigating the success of SISP within the context of environmental uncertainty would yield further understanding of the role of organisational context and it is influences on SISP (Kearnsa, 2004).

Environmental uncertainty is characterised and considered in terms of three dimensions: dynamism, heterogeneity and hostility (Miller, 1983). These dimensions were extensively measured and validated (Miller 1980, 1982). Information systems scholars used these dimensions in their research as contextual factors that have an impact of strategic information systems planning, and as a facilitator between information systems and business planning (Newkirka, 2006). Environmental dynamism can be defined as variation and unpredictability. Miller and Friesen (1983) used the term in their organisational research to define the degree of unpredictability in environmental change. Such environmental dynamism is characterised by the interaction of different external business environment forces, and signifies uncertainty in the extent to which managers are able to predict environmental change. Researchers have operationalised dynamism as a multi-item single construct representing the degree of product or service obsolescence, the degree of product or service technology change, the unpredictability of competitors' moves and the unpredictability of changes in demand for products or services (Miller, 1983; Sabherwal, 1992; Teo, 1997). In a further investigation, Teo and King (1997) conducted a factor analysis for the dynamism construct; they found that dynamism has two dimensions—the first is referred to as changeability (i.e. the degree of obsolescence and technological change), while the second is unpredictability (i.e. competitors' moves and demand changes). These factors were applied in a recent study of SISP by Newkirka (2006).

Environmental hostility is one type of environmental uncertainties (Dess & Beard, 1984), and entails both the scarcity of obtaining resources and the amount of competition in the external environment (Lederer, 2006). It also represents uncertainty in terms of the degree to which top managers lack knowledge about the attainability of resources and about the moves of their competitors. Academics have measured environment uncertainty in terms of the threats posed by labour and material scarcity, price and product competition and product quality and differentiation (Sabherwal, 1992; Teo, 1997; Lederer, 2006).

Environmental heterogeneity refers to the combination of external factors. Academics have operationalised heterogeneity in terms of the behavioural diversity of demands for products or services, the nature of competition and the behaviour of product or service supply (Sabherwal, 1992; Teo, 1997; Henery, 2007). Heterogeneous environments require understanding of not only a single factor about the products, customers and bases for competition, but also the interconnections of these elements (Goll, 1997). Presumably, this is because environmental heterogeneity increases the difficulty of managerial activity in interpreting embedded factors and information related to products, customers and competition (Grey, 1994; Mintzberg, 1973; Henery, 2007).

2.24 Organisational strategy

Business strategy can be identified through textual, multivariate or topological means (Hambrick, 1980). Although several types of strategy have been proposed (Ansoff & Stewart, 1967; Freeman, 1974; Porter, 1980), the most frequently used in empirical research is Miles and Snow's (1978) typology (DeSarbo, 2005). This has been the most recognised and widespread categorisation for the past 25 years (DeSarbo, 2005). In this typology, firm strategy is classified as follows:

- A prospector to the degree that it is active in introducing new technologies and finding new markets;
- A defender company which is inactive and aims to uphold its situation in a relatively stable market; or
- An analyser, with a 'view the alternatives and select the best' strategic orientation based on a trade-off between reducing risk and capitalising on new business opportunities (Raymond, 2008).

This typology has been validated and deployed in many empirical studies, including some in the context of SISP (Ramanujam, 1987; Chan, 1997; Cohen, 2008; Dong, 2008). However, Miles and Snow's (1978) typology initially included a fourth classification, specifically 'the reactor', or an organisation with no distinct competitive strategic orientation.

2.25 The SISP horizon

It has been thought that time is one of the main factors in the adoption of organisational strategy; thus, it is considered a key dimension of strategic planning (Ewing, 1972; Camillus, 1982; Das, 1991). This is the period in which the plan developed and implemented (Das, 1991). There is considerable consensus across various research studies on the planning horizons for

SISP. The conclusion that can be drawn is that the typical SISP planning horizon is 3 to 5 years (Henry *et al.*, 2008). Around a quarter of SISP research has an extremely short planning horizon of one to two years. There is also some support for the suggestion that the SISP planning horizon may be shorter in the UK than in the USA, and shorter still in Australia (Henry *et al.*, 2008). There is also limited evidence that planning horizons may be longer in developing countries. However, research on planning horizons in strategic management has lacked both scope and depth (Das, 2001).

2.26 Nature of the organisation

The size of an organisation is a crucial factor in the strategic decision-making process (Byrd *et al.*, 1995). The diversity of resources, functions and density among large, medium and small organisations can impact decision making (Mintzberg, 1973; Pyburn, 1981; Pyburn, 1983; Harris & Dave, 1993). Furthermore, many other issues such as international *versus* national activities and single *versus* multiple industries are also critical factors in terms of the nature of an organisation (Robson, 1997; Ward *et al.*, 2002; Weill *et al.*, 2004; Kearns *et al.*, 2004b). Understanding organisational conditions is the starting point for planning (Ward *et al.*, 2002; Acur *et al.*, 2006).

2.27 SISP planning resources

The assessment and consideration of the available resources to develop SISP are important matters in building up strategic decisions. Resources are thought to be the assets for any organisational planning (Brown, 2004; Mullins, 2005). Organising tangible and intangible resources can result in better planning (Mullins, 2005). Thus, successful SISP will occur through careful allocation of information systems application, where it can reflect the organisation's values and align with its resources and capabilities (Ward *et al.*, 2004).

2.28 Appraisal of financial resource investment

Financial resource investment and appraisal is important to SISP in the sense of evaluating the resources available to invest in IS (Acur *et al.*, 2006). The deployment of new information systems requires a budget and cost analysis (Ward *et al.*, 2003). There are two types of cost involved with information systems investments: direct and indirect costs (Irani, 2002). However, there are unclear measurements that help in the appraisal of the financial benefit of information systems within an organisation (Weill *et al.*, 2004). One appraisal method suggested by Wainwright (2003) involves analysis of information systems investment projects through the linear goal programming (LGP) mathematical method so that a balance between strategic benefit (long term) and cost-benefit (short term) can be achieved (Wainwright, 2003). An LGP model optimises goals rather than objectives by transforming objectives into goals, assigning an appropriate target level to them with appropriate deviations and grading each of the goals. Galliers *et al.* (2003) argued that some information systems projects pose problems such as the following:

- The adoption of inappropriate measures;
- Intangible costs that makes budgeting practices difficult;
- It is hard to comprehend human and organisational costs;
- Overstress costs;
- Dismissal of intangible benefits; and
- Lack of risk investigation assessments.

They found that the most common reason for the failure of information systems investment is a misinterpretation between organisational information needs and information systems' needs (Galliers *et al.*, 2003).

2.29 Stages of growth in the SISP process

There are different phases of the SISP process, each with a different context, processes, patterns and outcome. The understanding of the SISP process is conditional upon the knowledge a company has of SISP and the business environment. Grover and Segars (2005) represented the various phases of SISP process into three stages, as shown in Figure 7.

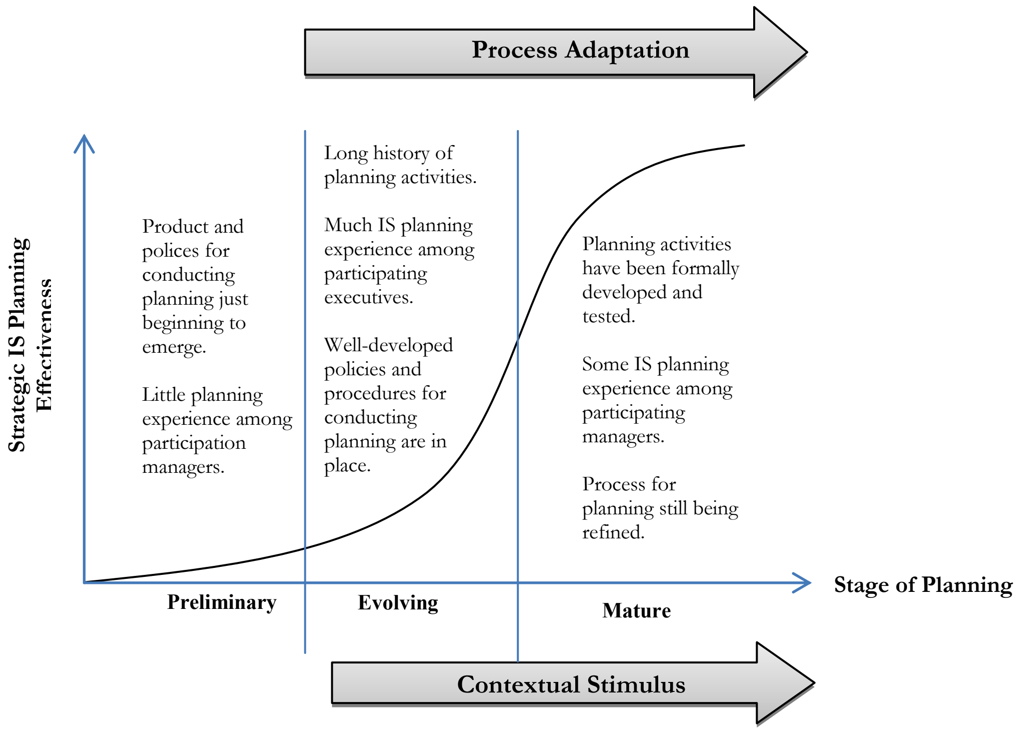


Figure 7: SISP stages of growth, adapted from Grover (2005, p. 767).

Phase 1—Preliminary stage: In this stage, firms are just starting to undertake SISP. Processes are usually not well-defined and managers do not have considerable planning experience; rather, they tend to be ad hoc and opportunistic. Top management provides very little or no input into the process, while information systems managers form planning panels to deal with the need for strategic IS.

Phase 2—Evaluation stage: In this phase, information systems diffusion is higher and top managers are proactive members of planning panels; they have more interest in SISP, particularly in the context of higher environmental uncertainty. In some cases, it is required to necessary for corporate planners and information systems planners to collaborate.

Phase 3—Maturity stage: This stage represents a situation where SISP is already in place, working to effectively adapt to environmental change.

Another model by Luftman (2000), represented in Figure 8, recognises the following five stages of strategic alignment maturation:

- The preliminary ad hoc process; the commitment process; The established focus process; The improved/managed process; and The optimised process.

Each level comprises six maturity criteria: communication maturity, measurement (business analysis) maturity, governance maturity, knowledge sharing maturity, scope and architecture maturity and skills maturity (Luftman, 2000; Sledgianowski *et al.*, 2004). The ad hoc process is no different from the preliminary stage in Grover's (2005) model; the following paragraphs briefly highlight each of these stages.

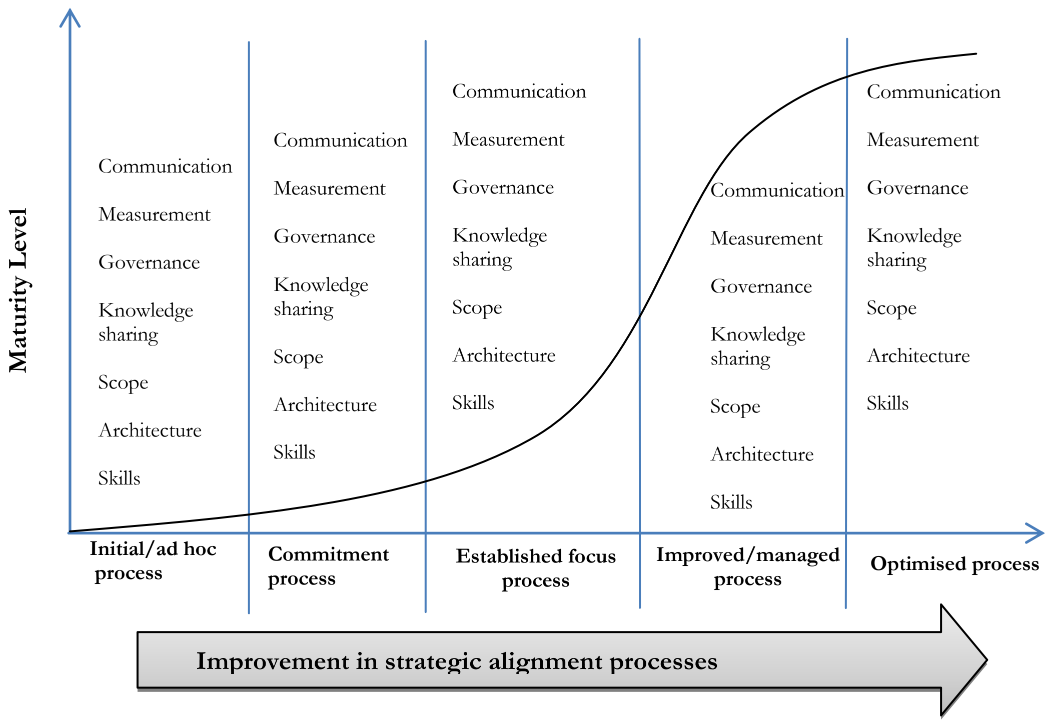


Figure 8: Strategic alignment maturity process stages (Luftman, 2000, p. 12).

2.30 Communication maturity

Communication maturity involves improving knowledge exchange, information, data and ideas among information systems executives and other business unit executives to establish a common working ground. This supports communication approaches in the development of SISP (Luftman, 2000; Weill *et al.*, 2004; Moor *et al.*, 2007). Thus, it is essential to recognise the correct communication strategy for SISP in order to be more effective. According to the model, communication strategies differ from one stage to another. Communication maturity can be measured by the level of understanding of business to information systems, understanding of IS by business, inter/intra-organisational learning, level of knowledge sharing and liaison effectiveness (Luftman, 2000; Moore *et al.*, 2007; Galliers & Leidner, 2003; Ariyachandra *et al.*, 2008).

2.31 Competency measurement maturity

To capture the value created by the deployment of IS to business processes, deep understanding of business processes is required. Developing measurements that reflect on the immediate contribution of IS to such business processes are needed. Ward and Daniel (2006) debated the complementary of external and internal contexts in the sense of information systems competency. They considered a model suggested by Treacy and Wiersma (1994) for strategy development. This model reflects the association between the external context (competitive forces) and internal context (resource-based view) of an organisation through three common stages: operational excellence, customer confidence and product management (Ward *et al.*, 2004). Through this, executives understand the business and its need to development better information systems plans. Information systems metrics, business metrics, balanced metrics, service-level agreements, benchmarking, formal assessments, and continuous improvement are all methods of measuring competency (Silvius, 2008; Benson *et al.*, 2004; Ward & Peppard, 2002; Luftman, 2000).

2.32 Governance maturity

Governance maturity is concerned with the degree of top management involvement in the processes of SISP formulation. This process is crucial in identifying accountability for decisions regarding SISP and the collaboration framework between the people responsible for those decisions (Luftman *et al.*, 1999; Weill *et al.*, 2004). People who are accountable for SISP are the governance team within an organisation; this team is usually responsible for IS elements such as the following:

- Addressing the role of information systems in the business;
- Recognising the requirements of integration and standardisation (IS architecture);
- Determining the main services (information systems infrastructure);
- Assigning business applications (business application needs); and
- Selecting projects and funds (information systems investment and arranging) (Weill *et al.*, 2004; Brown, 2006).

As indicated earlier, it is clear that considerable work relations among governance boards is a key element in developing more effective planning. The business strategy, systems strategic planning, the data, meta-data and information reporting structure, budgetary control, information systems investment management, steering committees and arrangement of business processes are all means of measuring governance maturity (Laudon & Laudon, 2004; Weill & Ross, 2004; Magdaleno *et al.*, 2008; Bartenschlager *et al.*, 2009).

2.33 Knowledge sharing maturity

Knowledge sharing maturity demonstrates the level of maturity in the relationship between information systems managers and business unit managers, whereas top managers receive IS as a strategic asset capable of adding value to the organisation's overall effectiveness. This supports the development of business strategy through enhanced trust among information systems executives and other business executives (Luftman, 2000). This in turn supports effective knowledge sharing to identify risks and opportunities related to the IS development plan. Knowledge sharing demands mature communication between IS stakeholders. Sharing knowledge as a strategic approach to developing an information systems plan could close the culture gap between information systems stakeholders (Galliers *et al.*, 2003, Turban *et al.*, 2005). Business awareness of the value of information systems, degree of perception of the role of information systems in strategic business planning, shared goals among stakeholders and relationship/trust style are all important in measuring effective knowledge sharing (Peppard, 2002; Luftman, 2000; Laudon & Laudon , 2004; Benson *et al.*, 2004; Ward & Mäkipää, 2006).

2.34 IT scope and architecture maturity

Information systems are relevant to different organisational units and levels. The demand for IT depends upon organisational structure and business processes. Thus, SISP is concerned with the assessment of the organisation's requirements of IT as a whole, defining the strategic systems needed by an organisation, and developing plans to implement such systems. Due to the important changes that may follow the introduction of new systems, change management methodology (capability based management) is an important part of any IS project.

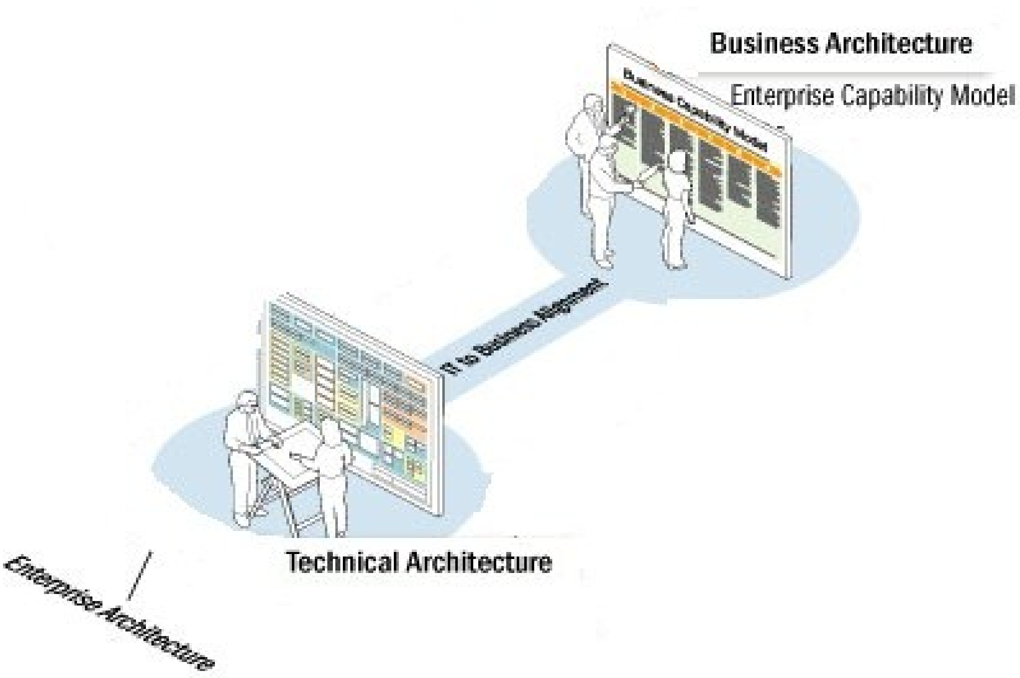


Figure 9: The IT-business alignment.

A project management methodology (PMM) is essential to ensure the successful implementation of information systems. Some projects may involve business process re-engineering (BPR) to detect and plan the specific improvements in the business processes to fit with IS projects and vice versa. Conversely, well-designed and mature IT architecture enables improvement in information systems capability, and new projects will be easier to manage, which is important for business objectives (Ross, 2003). The IT architecture includes a firm's list of technology standards, database architecture and process mapping and networks. Thus, IT architecture is important for aligning IS and business strategy.

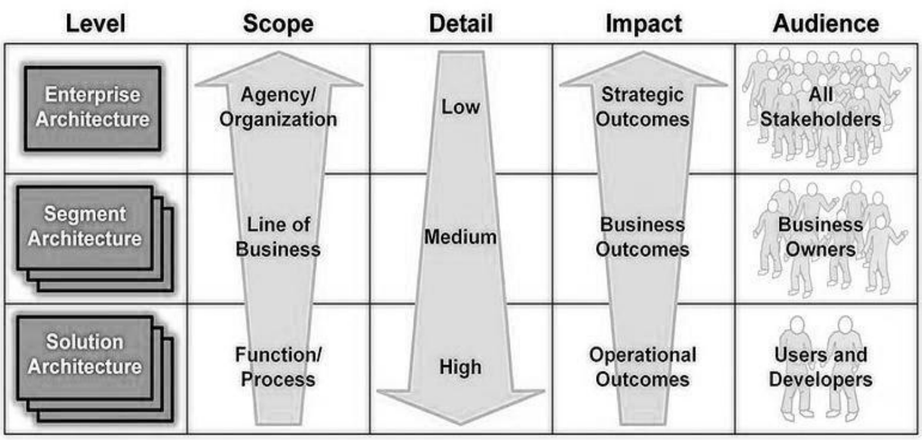


Figure 10: The levels of architecture, scope, detail, impact and audience.

Managers arrange the logic of a firm's IT architecture mechanisms such as through solution, data and technology infrastructure, as well as amending policies to fit the organisational goals and orientation. The role of IT architect including the following:

- Designing front and back offices of an organisational IS;
- Creating a flexible infrastructure that supports integration with business partners;
- Effective assessment and ability to develop application of emerging technologies; and
- Customising solutions tailored to customer requirements (Luftman, 2000).

It is vital that businesses appreciate the role of IT architecture; meanwhile, IT architecture must adapt to business needs to achieve the business' objectives and facilitate the expansion of suitable IT scope and architecture. The IT standards, architectural integration and architectural transparency, along with the flexibility of managing new technology, are all measurement indicators for scope and architectural maturity (Prahalad *et al.*, 2002; Luftman, 2000; Weill & Ross, 2004).

2.35 Information systems usage and skills maturity

Managing people skills is critical for IS-business strategy alignment: By identifying individuals' roles and relationships, better fit between IS users can be achieved (Mullins, 2005). The maturity in all levels of skills—especially the user skills level—allows the organisation to meet environmental changes, innovate in business and adapt quick to new IS applications (Laudon *et al.*, 2004; Sledgianowski *et al.*, 2005). On the other hand, increased information systems practice maturity augments the awareness of the importance of information systems (King & Sabherwal, 1992); thus, top management would be more likely to consider SISP in their organisations (Johnston & Carrico, 1988, Sabherwal & King, 1995). A case study carried out by Cerpa and Verner (1998) shows that one of the key issues related to SISP is how maturity in information systems functionality can manipulate the planning process of such IS; hence, there are some SISP scholars that have accepted IS maturity factors as contingent factors in their research into SISP (Pai, 2003; Grovera, 2005; Palanisamy, 2005).

From the above discussion, one can note that the SISP context is an essential constituent should be assessed as part of any SISP study. The term *context* is probably the most difficult to comprehend in relation to planning for information systems, as by definition the context dynamic and different from one organisation to another. Therefore, identifying a frame that is robust in representing the most important contexts that might affect the planning process is one of the aims of this research.

2.36 Strategic information system planning

Strategy process research as applied to corporate settings has an extensive history dating back to the 1930s. More recently, Mintzberg and Lampel (1998, p. 27), defined strategy process as a question of judgment comprising intuitive, visioning, and progressing learning; they stated that the business process is about change and sustainability. Thus, it is essential to include individual cognition, social iteration and analysis before and after the planning decision and negotiation during planning; it is also necessary to be responsive to the environment (Elbanna, 2008). As Ronald noted, 'Although the details of execution vary from company to company, strategic planning requires each company to decide first "what it wants to be." This decision determined by some combination of quantitative measures-dollar sales, growth in profits, return on investment-and qualitative measures environmental concern, industry leadership and innovations' (Ronald, 1978). Strategy reflects the answers to two questions: 'Where do we want to go?' and 'How do we want to get there?'. The term *strategy* generally separated into two research categories. The first is strategy content research, while the second is strategy process research (Huff & Reger, 1987). Strategy content research highlights the matter of strategy itself, addressing the similarities and differences among strategic units within an organisation facing similar situations such as growth and change. On the other hand, strategy process research tackles actions supporting strategy; it tends to investigate the process by which a strategy is stimulated by different factors affecting the overall outcome of strategic planning (Elbanna, 2008). Therefore, executives must handle this task, as it will influence the fortunes of the organisations. Awareness of both strategy process and the strategy content research could lead to the exploration of best practices for strategy-process-content and better decision making. In reality, the strategic decision-making process is complex; it has many dimensions and factors influencing it, whether tangible or intangible factors. Interpretations of these factors can be different from one manager to another, depending on his or her level of knowledge and ability to read the current and future surroundings, as well as his or her analytical level and interpretations of resistance and negative forces (Elbanna, 2008).

2.37 The traditional view *versus* the process view of leadership judgment

The difference between leadership judgment viewed traditionally and judgment viewed as a process is visible in different characteristics. A judgment call leads to outcomes by converting a plan into action; thus, leaders need a context to call upon, and this is unlike vision and strategy, although it includes elements of both. It has been argued that 'One way to create such a context is to develop a story line that describes a company's identity and direction this contains three elements: an idea about how to make the organisation successful; an articulation and reinforcement of the organisation's values; and a strategy for generating the energy needed to accomplish its goals' (Noel, 2007).

Table 5: 'Making judgment calls, the ultimate act of leadership' (Noel, 2007)

Traditional view	Characteristic	Process view
Single moment, static	Time	Dynamic process that unfolds
Rational, analytic	Thought process	Rational and analytic but also emotional and full of human drama
Knowledge, quantifiable	Variables	Often outside of a leader's domain; may relate to the call indirectly
Individual: A heroic leader makes the tough call	Focus	Organisation: The leader guides a process but is influenced by many actors and subsequent judgment calls
Making the best decision on the basis of known data	Success criteria	Acting and reacting through a judgment process that guides others to a successful outcome
Top-down: The leader makes the decisions	Actors	Top-down-up: Execution influences how judgments are reshaped
Closed systems in which decision makers hold information and do not explain their rationale	Transparency	Open process in which mistakes are shared and learning is used to makes adjustments
Unconsciously happens through experience of luck; reserved for top leadership	Capability building	Deliberately encouraged at all levels

2.38 Business analysis as part of the systems planning process

The role of business analysis is to recognise business requirements and the needs of IS, as well as to find solutions to business problems. Solutions often include the selection and development of information systems; however, they may also include business process improvement, organisational change and strategic planning and policy change. Internal and external business analysis needs to be addressed when planning for information systems and the overall role of technology and IS within an organisation must be identified. Financial analysis can determine how much should be spent on information systems planning and what the return on such investment will be. The most crucial issue in that the planning process for technology is that it must be part of the overall business plan. Whereas strategy helps to shape the direction an organisation wants to follow, a plan clarifies the view of the future that guides current decision making (McNurlin *et al.*, 2009). The tools used in the business analysis and planning process will depend on how complex the problem is. The information planning process is a complex activity in itself, and there is no single best approach and methodology that fits all organisations. Consequently, many companies apply a mixture of approaches. The planning process can become a time consuming and rigorous ordeal. Some have suggested that the following five phases should be included in any information systems planning process (Piccoli, 2008):

- Strategic business planning: This involves requirement gathering to systems planning and consists of an organisation's overall strategic direction, mission and vision;
- Information systems assessment: Here, current IS resources and how they serve the organisation's purpose and strategy are appraised;
- Information systems vision: This has to do with the ideal use of IS resources;
- Information systems guidelines: These guidelines comprise the set of statements articulating the use of an organisation's IS resources; and
- Strategic initiatives: These are three to five year long-term proposals.

Previously, SISP was the work of technology and systems specialists. At this point, however, it is a collaborative planning process that includes top managers, business unit managers, technology and systems specialists and occasionally outside stakeholder such as customers and alliance partners, as well as external consultants (Ruohonen, 1996). Thus, planning is an activity that has to have participants from all organisational levels, and requires both technical skills and business skills. The process involves discussion, explanation, negotiation and the achievement of a shared understanding (Piccoli, 2008; McNurlin *et al.*, 2009). In response to the rapidly changing technology and business environment, many organisations keep ahead of their competitors by quickly dealing with any changes (McNurlin *et al.*, 2009). The eight most popular business analysis techniques are listed in the following (McNurlin *et al.*, 2009):

- Stages of Growth: Here, business analysis is based on early successes, the maturity stages and the control and integration stage; analysis of these stages is useful in determining where an organisation belongs in terms of learning and development curves.
- Critical Success Factors (CSF): CSF involves analysis of key business areas, where the essential component of business must be accurate in order for an organisation to flourish.
- Competitive Forces Model(CFM): The business analysis based on Michael Porter's model, which advocates and determines what organisational IS is needed to survive five competitive forces, specifically the bargaining power of buyers and suppliers, new entrants, the threat of substitute products or services and rivalry amongst competitors.
- Value Chain Analysis: Here, business analysis is based on Porter's value chain model, which suggests five primary activities and four support activities. The main activities are 'inbound logistics, operations, and outbound logistics, marketing and sales and service' and the support activities are 'firm infrastructure, HRM, Technology, and procurement'; these must be attended to when planning for information systems.

- E-Business Value Matrix: This is a portfolio management method that addresses four classes of business analysis project, namely new fundamentals, operational merit, rational experimentation and innovative strategy.
- Linkage Analysis Planning: This involves business analysis based on the need for inter-organisational information links and the identification of the power of relationships among suppliers, buyers and strategic partners.
- Scenario Planning: Here, business analysis is based on the expectation of future problems, and the actions associated solving such problems that might emerge.
- SWOT Analysis: Most business analyses also include a situation analysis of strengths, weaknesses, opportunities and threats (SWOT).

These techniques address an organisation's internal and external environment, strategy formulation, and specification of a goal, along with tactical and operational plans for achieving that goal (Semiawan & Middleton, 1999).

2.39 Business analysis

The intended result of the business analysis is usually IS strategy planning. In the initial planning preparation, those who are responsible for the business analysis need to decide on which mixture, if any, of the above planning techniques to deploy as they plan for information systems in their organisations. The business analysis report should include a clear vision of what needs to be solved in terms of closing the gap between business practice and information systems practice, define techniques related to what business IS application needed, determine when it should be implemented, assess how to manage the quality of implementation and facilitate the process of change (Ishak & Alias, 2005). The outcome of business analysis should be documented as a complete report along with plans for the development of systems-oriented future reference related to the role of IS within the organisation (Allen, 1995). There is no typical standard arrangement for such a report (Mcleod & Schell, 2007).

2.40 The SISP process

Most academics focusing on SISP emphasise strategy as a process. This comprises three key elements, specifically the strategies as process, the context and the consequence of actions (Hutzschenreuter & Kleindienst, 2006). This study eliminates these broad complex decision-making processes, limiting them to the current literature of SISP. Comparing to strategy process research, SISP process research is relatively new (Mentzas, 1997, Grover, 2005, David & John, 2006). Mentzas suggested that the SISP process can be 'defined as a set of partially ordered steps intended to reach a unified goal' (Mentzas, 1997). The planning process should reflect the whole organisation, as well as minor business process activities in business units, strategic directions and relationships (Laudon *et al.*, 2004; Turban *et al.*, 2005). It has been reported that there are some common reasons for the adoption of SISP processes. These are as follows:

- Refining the IS-business alignment;
- Attaining competitive advantage and creating business opportunities;
- Increasing the flexibility of information systems infrastructure for the organisation's future in order to build cost effectiveness; and
- Assigning suitable resources and capabilities to diffuse information systems effectively throughout an organisation (Teo *et al.*, 1997; Ward *et al.*, 2002).

2.41 SISP success as a dependent factor

The SISP success construct should reflect the issues that make information systems planning more effective, as it will be seen as the result of any SISP outcome; thus, it should be a dependent factor. The original theoretical construct of SISP success emerged from the strategic business planning literature (Venkatraman, 1987). According to Fitzgerald (1993), 'Justification for evaluating the effectiveness of SISP is noticeably absent in the IS planning literature; however, it's addressed in the business planning literature' (p. 337). The two dimensions of SISP success that have emerged from the SISP literature are the fulfilment of key objectives and improvement in planning capability. Researchers in the area of SISP have adopted this framework (Raghunathan& Raghunathan, 1994); however, further research has shown that SISP success includes four dimensions, namely alignment, analysis, cooperation and improvement in capabilities (Newkirka & Lederer, 2007).

Due to the complexity of the impact and value SISP has in an organisation, the outcomes of SISP cannot be eliminated to be measured in a simple financial measurement equation as return on investment, payback or internal rate of return (Segars, 1998; Sugumaran, 2004). Therefore, SISP success should be looked at from the perspective of the dimensional components mentioned above. The first component is alignment as an indicator to SISP success: Alignment refers to the degree of association between the IS strategy and the business strategy (Baets, 1992; King, 1978), and the more IS is aligned with the business strategy, the more successful SISP will be. Alignment also improves the relationship between top management and CIOs. Thus, it encourages top management to provide leadership and financial commitments to IS projects that would assist firms to realise their objectives (Lederer, 2006). The second dimension of SISP success concerns with the inner organisational operations and performance (Hackathorn, 1988). Analyses of such operations will return greater SISP success, as these give a more in-depth view of organisational operations, processes and procedures, for top managers to take into consideration when planning for IS.

Thus, the firm can use information technology to compete through improved flexibility of the architecture, applications and databases and their better integration with business strategy (Newkirka , 2007). The third element of SISP success is the level of cooperation between top managers in terms of priority and task scheduling and organisation when it comes to executing SISP, as well as the division of managerial responsibilities to carry out the successful implementation of the plan in question (Henderson, 1990). Throughout the corporation, top managers must make sure that key stakeholder and users support both the process and the content of SISP (Pai, 2003).

According to Grove, 'When general agreement concerning development priorities, implementation, schedules, and managerial responsibilities, a degree of cooperation attained. This level of cooperation is important in order to reduce potential conflict which may jeopardise the implementation of strategic IS plans' (Grove, 2005). Cooperation can strengthen the relationship between managers, systems users and systems developers; thus, it reduces the possible conflicts in order for SISP to be successful (Newkirka & Lederer, 2007). The fourth dimension of SISP success is the improvement in IS capabilities, which corresponds to the improvement of the potential of planning systems success (Ramanujam, 1987). Organisational learning that includes planning experience should result in improved information systems capabilities (Pai, 2003). It has been suggested that different organisations have distinct information planning processing capabilities (Teubner, 2007).
Thus, successful IS planning based on a firm's capabilities will be different from one organisation to another.

2.42 Overview of SISP models and methodology

The SISP process is the vaguest among the SISP constructs, as no one model fits all organisations perspectives. Earl (1993) studied formal SISP in a large organisation and was able to identify the following five SISP processes, or as he called them, approaches:

- The business-led approach;
- The method-driven approach;

- The administrative approach;
- The technological approach; and
- The organisational approach.

Bailey and Johnson (1994) suggested that in practice, strategy processes reflect combinations of the six theoretical perspectives, which can be used to measure strategy processes within an organisation. One of the strengths of Bailey and Johnson's strategy process measurement is that it accommodates the strategy processes of both private and public sector organisations and allows the measurement of both large and small firms. The six dimensions are as follows:

- The planning perspective;
- The incremental perspective;
- The political perspective;
- The cultural perspective;
- The visionary perspective; and
- The ecological perspective.

Quite a few scholars have combined different perspectives on the decision-making process in their investigations of SISP (Earl, 1993; Dean & Sharfman, 1996; Eisenhardt, 1989; Hart & Banbury, 1994; Elbanna *et al.*, 2008). According to Palanisamy (2005), the six most popular IS planning methodologies classified into two elements. The first is the impact of information systems on organisational activities, tasks and processes, while the second is the alignment models, which focus on the alignment between information systems and the business plan (Pant & Ravichandran, 2001). The impact model includes a value chain analysis model which focuses on the key value adding to business activities and processes that could be made more effective using IS (Porter, 1984). The critical success factors model focuses on the key information needed for senior management and builds IS around such needs (Rockart, 1979). The alignment models include business systems planning (BSP from IBM), which contains top-down analysis and planning with bottom-up implementation (Pant & Ravichandran, 2001). The information requirements for this model are derived from business processes as units. The strategic systems planning (SSP) model focuses on the functional areas of business and the data architecture is derived from the business function; this model combines top-down and bottom-up approaches. The information engineering model/method (IEM) is a more data-oriented model which provides techniques to build an enterprise data model, process models and a comprehensive knowledge base model that provides guidelines to create and maintain information systems (Pant & Ravichandran, 2001). Method/1 from Andersen Consulting is a layered approach with a methodology as the top layer, techniques in the middle layer and tools supporting techniques as the bottom layer.

Table 6: Strengths and weaknesses of existing IS planning models (Palanisamy, 2005)

Planning Methods	Strengths	Weaknesses in Flexibility and Success
Value chain analysis	Focus on value addition for key business activities	Does not support changes in business strategies. No response to environmental fluctuations
Critical success factors (CSF)	Helps to prioritise key information systems and requirements based on critical decisions being made by users	Ignores non-key applications in IS planning. More subjective in nature. Fails to cover external systems
Business systems planning (BSP)	Application systems and requirements are derived from firm's business processes	Focuses only on internal information requirements and does not cover external data-processing needs. More process oriented and no value addition
Strategic systems planning (SSP)	Information architecture is derived from the business strategies and functional areas of business	Functional area analysis is done in an isolated manner and information requirements are not derived from cross-functional areas. Ignores systems integration issues
Information engineering (IE)	Application systems and requirements are derived by analysing data models of an organisation	The more data (internal) -oriented and no consideration of external data and value addition. More analytical in Nature
Method/1	A three-tier approach: the top tier is the planning methodology, middle tier is the techniques supporting the methodology and the bottom tier has tools supporting the techniques	Ignores the aspect of integration of cross-functional information systems

Many SISP methods, models and theories have been manipulated to ensure the success of SISP in organisations. Organisations usually adjust, redesign and alternate them to suit their needs in order to implement IS more effectively. Byrd *et al.* (2006) developed an instrument containing multiple items for each of the six constructs they modelled, namely CIO, SISP, IT advisory committee, application functionality, technology integration and data integration. The final survey was distributed to IT managers in 470 fortune 100 companies in the US. The outcomes validated the hypothesis that the researchers were testing. They found that a higher level of CIO responsibility leads to more participation from the IT advisory committee, which in turn leads to more extensive SISP, bringing about higher technology integration, data integration and application functionality.

Campbell and Kay (2005) engaged in exploratory research based on focus groups with six seniors IS managers. The information gathered was used to develop casual loop systems to establish the importance of aligning IS with the business processes, goals and strategies. They attempted was to define a structure that shows how information systems and SISP interact and depend on each other. Newkirka and Lederer (2007) viewed the SISP process as representing conceptual modelling techniques which are used to analyse enterprise models, data models and process models; such analysis includes strategic awareness, strategy conception, situation analysis, strategy formulation and strategy implementation planning. This method relies more on information engineering and the key SISP actors are the managers or the business analysts and the information collected from various departments within an organisation, including both structural information about the firm and business process information developed by business analysts.

They conducted their research with the understanding that environmental uncertainty has an effect on SISP, and established that the more uncertainty in the business environment leads to more attention paid to extensive SISP process. Furthermore, Grover (1998) recognised six significant process dimensions of SISP; they claimed that these dimensions are generalisable in their descriptions of planning while supplementing more structured general ‘approach’-based descriptions.

The dimensions are as follows: comprehensiveness, formalisation, focus, flow, participation and consistency. These dimensions have recently been used by Grover and Segars (2005) in their study of empirical evaluation of stages of strategic IS planning. In this study, the author will adopt their dimensions of the planning process. Table 7 highlights some other SISP planning processes.

Table 7: Formal planning methods				
Formal planning	**Key SISP actors**	**Planning techniques**	**Scope of information used**	**References**
Business case	Project managers Business managers	Cost–benefit analysis Quantification of tangible benefits Qualitative estimation of tangible and intangible benefits Roadmaps	Information from all departments and business processes Information about present and future company goals and strategies	Irani *et al.* (2005), Sarkis and Liles (1995), Ward and Peppard
Internal contractual arrangement	Business manager Department manager	Service agreements Report cards for contract negotiation and monitoring	Information from particular departments	Feeny and Willcocks (1998)
Post-implementation review	Project managers Business managers Users	Project success evaluation using pre-defined and post-defined success measurements	Information from the reviewed project Information from interrelated projects Contextual information from the entire firm	Lin and Pervan (2003), Brady *et al.* (2005)
IT balanced scorecard	Top management Functional managers IT managers Analysts	Cost monitoring based on quantitative business metrics	IS information from various departments Customer information Business process information HR information Finance information	Teubner (2007)
Importance performance portfolios	Process planners	Quantitative or semi-quantitative evaluation of process performance	Information about one particular IS-supported business process Contextual information from the entire firm	Ward and Pappard (2002), pp. 225-226

The SISP methodology can be looked at from five different perspectives: the SISP process, assessing the environment, considering strategic alternatives, selecting a strategy and planning the execution of the strategy (Mentzas, 1997; Chia, 2005). On the other hand, too great a concern with SISP involves large financial commitments, as this endorses a fundamental change within the organisation infrastructure and internal organisational environment; furthermore, emerging information technology may make the obsolete before it is implemented (Sambamurthy, 1994; Min, 1999). In the same context, SISP methodologies have also been extended to include individual, behavioural, organisational and environmental factors (Chan, 1998; George, 2003). Therefore, careful planning should involve the best possible level of comprehensiveness of different organisational factors to avoid failure in IS (Henry, 2003). From the discussion above, the author would argue that neither the planning models nor the planning methods will satisfy the search for a dynamic and comprehensive pattern, method or approach that can capture and measure the SISP process, including formal and informal methods, and reflect on the organisational context to formulate clearer and perhaps more robust and dynamic IS plan that enables better planning outcomes. However, the cumulative impact of the work discussed in this section is important in that it lays down a more robust foundation for the SISP processes research paradigm.

2.43 Established insight from the literature review

- Forming the extensive nature of SISP and its practice;
- Recognising the methodologies available within SISP;
- Identifying the SISP problems within an organisational context;
- Establishing the key stakeholder groups involved with SISP;
- Establishing the need for SISP alignment with business strategy; and
- Detecting the theory subject of test (Pyburn, 1983; Sullivan, 1985; Grover, 2004; Sousa & Voss, 2008).

Selecting the right information systems is important for any business; a mismatch between IS and business strategy could be very problematic to a business' growth and efficiency, as these might be limited growth by a lack of fit between business growth and the system's capacity. That is why SISP is a concern of maximum relevance in practice, and still among the highest ranking issues in MIS research (Luftman, 2006; Teubner, 2007). The main focus of this research is to investigate the obstacles that prevent the success of SISP in Libya by focusing on the effect of organisational context on the SISP process and SISP outcomes.

2.44 Main themes emerging from the SISP literature

Through the analysis of the SISP literature, eight research themes emerge from this field, and these are as follows:

Theme 1: The main characteristics of SISP. Through extensive research into SISP literature that covers a wide range of geographic regions and concentrates equally on private and public sectors, the nature and characteristics of SISP have been delineated. Consequently, a significant dimension has been emerging addressing the challenges and difficulties along with identification of the main influencing factors within SISP (Premkumar & King, 1992; Luftman, 2006; Teubner, 2007).

Theme 2: The importance of SISP. That the value added (see 'Value extracted from applying SISP') from SISP enhances an organisation's overall effectiveness is explicitly shown throughout the SISP research looking at both developed and developing countries (Goonatilake *et al.*, 2000; La Rovere & Pereira, 2000; Munkvold & Tundui, 2005). This theme is constructed from management information systems (MIS) research concerned with how business organisations perceive the importance of information systems as an organisational tool. One of the major issues frequently addressed by researchers in this field is the improvement of SISP in order to leverage the benefit of information systems in an organisation.

Theme 3: Main SISP stakeholders. This research theme is concerned with identifying the main stakeholders involved in the strategic planning for information systems and the relationship between them. The main stakeholders are those who influence the direction of information systems within an organisation; there are three groups concern with SISP:

a) Top management—it is not important for top managers to be specialists in information systems;

b) Information systems management—specialists; and

c) Information systems users' management—data entry and analysis (Babita, 2008).

Theme 4: SISP's alignment with business strategy. There has been extensive attention in the SISP literature to the alignment of information systems and business strategy. Alignment is also one of the measures used to determine the degree of SISP success. Thus, alignment is a significant research theme, because attaining information systems–business strategy alignment continues to be a major challenge in today's business organisations (Henry, 2003; Ward, 2004; Segars, 2005; Dong, 2008; Lederer & Alice, 2010).

Theme 5: Strategic use of information systems. Agreeing on standard definition for SISP is important; however, there is debate over defining information systems as strategic resources in the literature review, which is evident in the lack of consensus regarding terms and concepts related to the strategic use of information systems. However, the majority of researchers agree that when information systems are strategically positioned, they can provide businesses with a competitive edge, and the proper usage of IS could create enormous business opportunities. Therefore, clarity over the strategic use of IS in business is important to SISP; thus, one of the aims of this research is to clarify the strategic use of information systems in business.

Theme 6: The SISP methodology, approach and process. SISP methodologies and approaches have received continuous attention and are still a central concern to most well recognised SISP scholars; thus, it is one of main research objectives to identify a robust SISP process that extends beyond the possible limitations of SISP methodologies and approaches (Gibson & Nolan, 1974; Hackathorn & Karimi, 1988; Earl, 1993; George, 2003; Grover, 2005; Pakorn Surmsuk, 2007).

Theme 7: Relationship between organisational context and the SISP process. Many studies have focused on the relationship between organisational context variables and the development of SISP, while the SISP process is affected by organisational context. It remains to be investigated what aspects of organisational context have the most influence and how to manage this influence, given the fact that organisational contexts are different from one organisation to another (Lederer & Sethi, 1988; Louis, 1990; Grover, 2005; Cohen, 2008).

Theme 8: Validation of SISP constructs measurement. This theme is very important, as there are a many measurement models for the components and concepts discussed in the SISP literature. Thus, it is vital for research in this field to identify the proper measurement models, as well as to build a reliable and valid measurement model (Ramanujam, 1987; Lederer & Sethi, 1988; Segars, 1998; Venkatraman, 1989; Grover, 2005).

2.45 Theories related to the nature of the research

2.45.1 Soft systems theory and SISP

One theory worth looking at in this research is the soft systems methodology (SSM) theory. Checkland and Poulter (2006) defined SSM as 'an organized way of tackling perceived problematical (social) situations. It is action-oriented methodology it organises thinking about a situation so that an action plan can be arranged to bring about improvements'. Soft system theory tackles real-world problems, and therefore an understanding of an organisation's culture and business process is required to find a suitable solution (Checkland & Scholes, 1990).

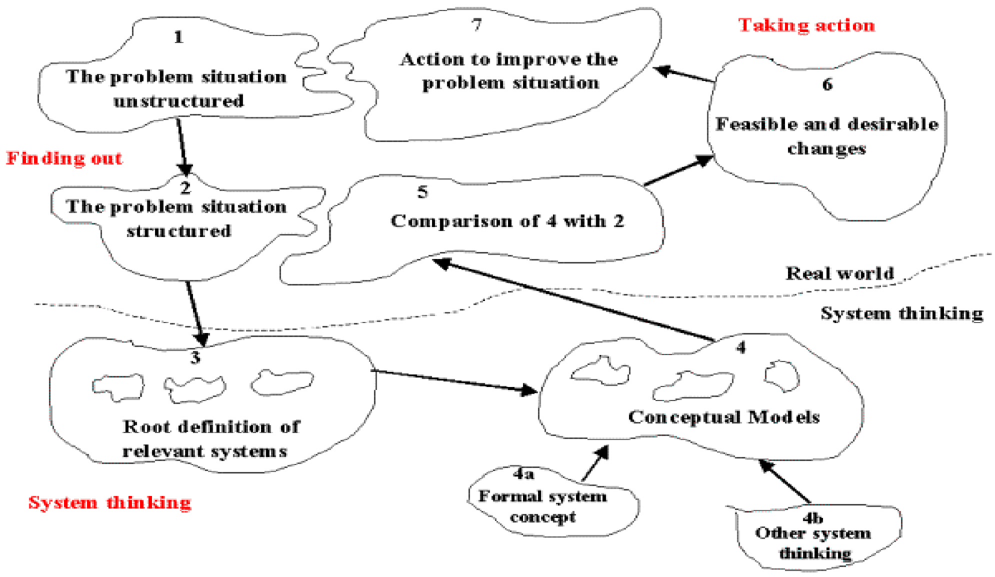


Figure 11: The seven-stage process of SSM (Checkland, 1981, p. 163).

Information may be embedded within organisational structures, procedure, routines and the attitudes of a group or individuals, as well as in an organisation's stories and informal social networks. Thus, a soft approach requires focus on the informal, social and political nature of an organisation throughout the process of information systems planning (Abrahamson, 1991). SSM is usually applied to situations where there are conflicts among stakeholders or where the objectives of a system are controversial (Venable, 1999). Therefore, when planning for information systems, SSM should be taken into account; this theory could lead to more successful SISP, because if an information systems plan includes soft systems aspects in the development processes, more robust systems may be created by emphasising on the intangible soft systems embedded in an organisation and replacing them gradually with more tangible manageable information systems applications.

2.45.2 Socio-technical systems theory

Socio-technical systems theory provides insights into organisational and cultural issues; the theory focuses on IS within an organisation, as such systems include both machines and humans. The socio-technical systems approach is associated with soft systems theory, as it conceives of organisations as systems wherein technical, social and environmental factors are interrelated (Fisher & Lamp, 2003). As with soft systems philosophy, the development of socio-technical systems has recently been reviewed (Mumford, 2000). Suggestions focus on both the scope of IS and the context, making the theory appear 'sociologically naive' in the modern business environment (Avgerou, 2002). Therefore, it is difficult to determine a law-like relation to the rapidly changing environments of such technical IS phenomena (Dirk & Germonprez, 2008), since the information systems context goes beyond organisational limits. Therefore, the progress of understanding the conditions of socio-technical change in DCs requires significant information systems research and practice.

Recently, Walsham (2006) discussed the problem of scale and inflexibility in health information systems using the socio-technical perspective and focus on information infrastructures. Others have identified the strain of escalating technological complexity in terms of human resources capacity, weakness of political support and unanticipated effects on IS; it supported local customisation and knowledge development rather than a top-down approach and centrally controlled information systems (Ciborra & Associates, 2000). This theory gives more credibility and determination to SISP research related to developing countries. It aims to develop information systems theory that can be more practical and advocate the importance of SISP process and yet recognise that organisational contexts are not just important factors, but rather determining factors influencing the way in which information systems are prearranged. The theory should be operational and demonstrate strategic planning is an oxymoron, since diverse factors synthesise to form SISP.

2.45.3 The contingency theory of information systems

Like the soft systems theory and socio-technical systems theory, the contingency theory in management information systems deals with social and technical aspects of organisational information systems (David, 2004). In its basic conception, the contingency theory of IS is used to maximise the organisational opportunities using IS, and supports finding an appropriate fit among main variables in the theory, including organisational context, which is represented in the theory as contingent variable (Grover, 2004). Table 8 shows the main characteristics of contingency theory in MIS research.

Table 8: Contingency theory in MIS research (Weill, Peter; Olson, & Marorethe, 1989)

Main Dependent Construct(s)/Factor(s)	**Efficiency, Organisational performance**
Main independent	Strategy, Technology, Task, organisational size, Structure, and Culture
Originating author(s)	Fred Fiedler
Level of analysis	Firm, individual
Originating area	Psychology, strategy
Description	Class of behavioural theory that contends that there is no robust IS model fitting all organisations; one model that is effective in some situations may not be successful in others.

In this study, the author will look at the main constituents of SISP to explore the specific relationship between the SISP process and the success of SISP in Libya, and establish whether this relationship is 'contingent' upon the SISP context. This investigation will be constructed upon previous work outlining the contingent character of SISP (Pyburn, 1983; Sullivan, 1985). There is a large body of contingency theory literature. Kickert (1983) initially established general theoretical models of contingency theory. Followed this, Venkatraman (1989) established a comparable theoretical model to measure the 'fit' among strategy and context within SISP. Contingency theory has been reviewed as a theory that abandons the idea of 'one best way of organising IS fits', and instead adopts the idea of 'situation-dependent organising' (Kickert, 1983). Nevertheless, when applying contingency theory in this study, the SISP context is a changing situations variable involving a 'fit' between the SISP process and SISP success. Scientifically, this adjusts the core of y = f(x, z) where 'y' is SISP success, 'x' is the SISP process and 'z' represents the SISP situation/context. In this research, the elements of the 'situation' are investigated and identified as SISP context.

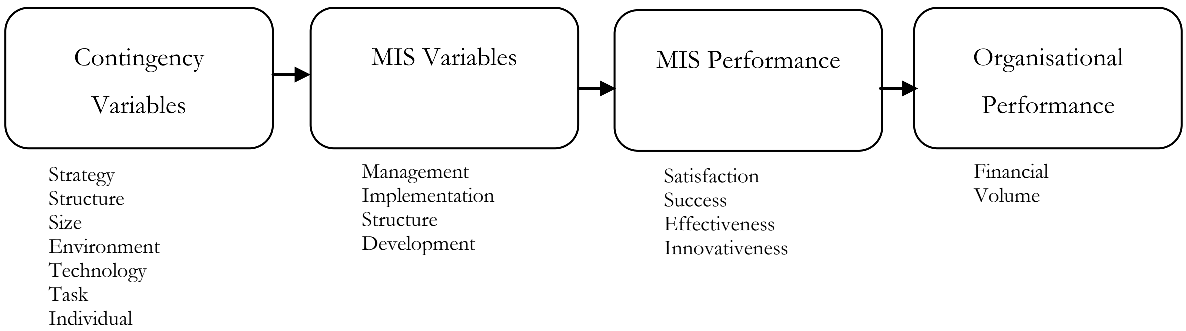


Figure 12: Representation of contingency theory in MIS research (Weill, Peter; Olson, & Marorethe, 1989).

Moving back to the SISP theory of 'fit', there is evidence that SISP success is situation dependent (Pyburn, 1983; Sullivan, 1985). Moreover, various researchers have suggested that theory-based models are needed for the appropriate implementation of IS in changing organisational contexts (Sousa & Voss, 2008). From this perspective, this research shows that contingency theory is most appropriate for modelling the main constituents of SISP—context, process and success—in private and public Libyan organisations, and it has recently been one of top five theories used by researchers in MIS (Association of Information Systems [AIS], 2009). More details on the theoretical model used in this study are presented in the SEM methodology chapter.

2.46 Justification for using the contingency theory in this research

There are many reasons for selecting contingency theory over other theories in this research. First, it conforms to the nature of the research investigation, approach and strategy. Contingency theory is well developed and structured, allowing the relationships between it is constructs and variables to be tested in a quantitative manner, ultimately yielding a more accurate and robust result. This theory is recognised as one of the top five in management information systems research according to the Association of Information Systems (AIS). Furthermore, since it represents strategic management research, the 'fit' model applies perfectly to shaping the relationship among the SISP constructs in this study (more details on this topic are given in the methodology). Third, the theory recognises the gaps in SISP research to justify the current research questions. Therefore, the theory will be applied as a conceptual model that defines the research hypotheses and the relationships among its constructs and variables.

2.47 Defining the research themes according to contingency theory

Three main themes have been identified as important for this research; these are as follows:

- The SISP organisational context: The organisational context within which SISP processes are carried out (King, 1978; Pyburn, 1983; Sullivan, 1985; Harris & Dave, 1993; Cohen, 2008).
- The SISP process: The approach or methodology used in SISP (McLean & Soden, 1977; Galliers, 1987; Lederer & Sethi, 1988; Earl, 1993; Segars, Grove, & Teng, 1998; DeLone & McLean, 2003; Terry *et al.*, 2006). This is a wide term that includes both hard and soft aspects of the process.
- SISP success: The success of SISP is determined by different factors, including the comprehensiveness of analysis, level of cooperation and alignment of IS with overall organisational strategy as perceived by the stakeholders (Martino, 1983; Wilson, 1989; Earl, 1993; Segars, Grove, & Teng, 1998, Delone & Maclean, 2003; Randy & Bradley, 2006).

2.48 Gaps in SISP research

From the review of the literature, it is clear that most SISP research focuses on the USA and UK, with particular emphasis on the private sector; thus, few studies have been conducted outside of this economic area. A small amount of SISP research has been conducted on the EU excluding the UK, as well as Australia, and a very few studies have focused on developing countries, mostly in terms of South Africa and the Far East, mainly China, Taiwan and South Korea. A few, barely explicit SISP studies have focused on regions like India, the Middle East and South America (Walsham, 2006).

The research that has been conducted highlights the hard factors related to the strategic IS plan, while little attention given to socio-technical factors; yet, these factors have been shown to need elucidation through research in other fields of strategic management studies. The primary assumption may be that socio-technical factors are inconsequential to IS planning; however, this should be tested, mainly for the concern of organisational cultures. An investigation to expand SISP to condense these biases would be valuable.

2.49 Gaps within research on the nature, extent and characteristics of SISP

Most of the research on the nature, extent and characteristics of SISP has been inflexible in terms of measuring the success of SISP at different stages of growth. The best known model of information systems is Nolan's stages of growth model (Gibson & Nolan, 1974). Nolan suggested that firms can be more successful if they plan for IS on the bases of initiation stages. He suggested that the model of growth can be conceived as a learning model for IS-Business fit; this progresses through the following stages:

- Initiation;
- Contagion;
- Control;
- Integration;
- Data administration; and
- Maturity.

Nolan suggested that all the stages are influenced by the organisational context (i.e. environment, changing technology) and adaptation to this context is carried out by internal adjustments. Eventually, in the 'maturity' stage, systems will reflect their full organisation context. Grover (2005) agreed that it is possible to observe stages of evolution within SISP, and King and Teo (1997) suggested, empirical evidence in the planning context is sparse, finding that as IS planning evolves, the effectiveness of alignment of information systems and business strategies improves. This emphasises the relationship between organisational context and SISP success (Grover, 2007; Henry, 2007; Cohen, 2008; Chia *et al.*, 2008). However, the gap between the SISP process and SISP success under different contextual factors which may prevent or promote growth and the capability of adoption and learning is still widely open to speculation and less empirically evident.

2.50 Gaps in research on the SISP process and organisational contextual factors

More research is needed to extend the understanding of the SISP process, especially in developing countries. Therefore, speculations as to which SISP methodology/approach is better for SISP growth in developing countries under different contexts is still a major gap in SISP research. The organisational contextual factors are well defined in SISP literature; however, there has not been much research to date conducted from this perspective on developing countries; this should be rectified, since there is evidence from prior research to suggest that some organisational contexts influence the SISP process and its effectiveness, ultimately affecting the overall organisational performance. The gap in investigating and testing the effect of organisational context on the SISP process is a major research field on its own, and could lead to more research into the operational side of information systems in terms of issues such as control and security, in-house or outsourced technology plans, sustainability and flexibility plans; therefore, the organisational context still a major gap in SISP research.

2.51 The gaps in research on SISP in SBU structures

A few recent studies have drawn a line between CIOs and CEOs in terms of IS strategic decisions (Terry, 2007). However, there has been no major research to date that incorporates both the corporate strategic level and business unit level when planning for IS, although the field of strategic management has clearly differentiated corporate strategy from the strategic business unit (SBU) (Anil, 1987). There appears to be no similar research on SISP looking at the distinction between corporate level planning for IS and SBU level planning for IS. Therefore, the issue of improving cooperation between CIOs and CEOs to enable more SISP success remains a major gap in the research. Moreover, there is no evidence on how SISP strategically links to SBU and corporate strategy with national and international IS infrastructure; this suggests that there is a gap in macroeconomic and microeconomic research on SISP, and more analysis of these areas will benefit the SISP literature.

2.52 Next-Generation SISP

In the last two decades, the digital infrastructure of business has witnessed a radical shift toward a new digital era (Venkatraman *et al.*, 2010). During this time, information systems strategy has been observed as a function-level strategy that essentially has to be aligned with organisation business strategy; this observation is also reflected in business process redesign, intra- and inter-organisational systems, the business value of IT and IT outsourcing (Henderson & Venkatraman, 1993). Today's digital businesses are fundamentally reshaping traditional business models and processes, from the distribution model and cross-functional business to global processes that enable work to be carried out across the boundaries of time, distance and function (e.g., Sambamurthy *et al.*, 2003). The information systems–enabled business models also promote different forms of dynamic capabilities that are apt for turbulent environments (Pavlou & El Sawy, 2006). Moreover, the advancement in digital infrastructure is transforming the structure of business relationships inside and outside organisations. In addition, products and services gradually include embedded technologies; thus, it is becoming almost impossible to disentangle business processes from their underlying IT infrastructures (e.g. El Sawy, 2003; Orlikowski, 2009). Digital platforms are enabling more effective business networks and inducing new forms of business strategies (e.g. Burgelman & Grove, 2007). Theoretical structures for strategy making in nonlinear dynamic environments are also emerging (e.g. Davis *et al.*, 2009; Pavlou & El Sawy, 2010).

The evolutions in IT cost, performance and capability in terms of computing storage, bandwidth and software applications have provided choices to business in utilising information systems to cut costs and improve efficiency. Technology such as cloud computing has opened a new arena in digital business; through this technology, for example, business applications can be used when needed, the consulting name for this is software as a service (SaaS). This can also take advantage of service-oriented architecture (SOA) to allow software applications communicate with each other more effectively when and where this is needed. Software service can act as a service supplier, revealing its functionality to other applications via public brokers, and can also act as a service requester, incorporating data and functionality from other software that acts as a service provider. Major enterprise resource planning (ERP) software vendors use SOA to build their SaaS products.

Table 9: Worldwide IT spending (billions of US dollars) (Gartner, 2010)

(%)	2009 Spending	2009 Growth	2010 Spending	2010 Growth
Computing Hardware	326.4	-13.9	331.7	1.6
Software	220.7	- 2.1	231.5	4.9
IT Services	780.9	- 3.5	824.2	5.6
Telecom	1,887.7	- 3.6	1,976.6	4.7
All IT	3,215.7	-4.6	3,364.0	4.6

With the rapid expansion of IS adoptions in businesses across the globe, it is time to reconsider the role of information systems strategy; now, rather than a functional-level strategy, it represents more of a fusion between information systems strategy and business strategy into an overarching digital business strategy (Venkatraman *et al.*, 2010).

2.53 Enterprise resource planning (ERP) and the need for SISP

An enterprise resource planning (ERP) application is 'a process of planning and managing all resources and their use in the entire enterprise. The software is comprised of a set of applications that automate routine back-end operations, such as financial, inventory management and scheduling' (McLean & Wetherbe, 2004). Therefore, ERP is 'software [that] attempts to integrate all departments and functions across a company onto a single computer system that can serve all those departments' particular needs' (Koch, 2006). However, Koch suggests that ERP has nothing to do with research and planning, since SISP is about the process of determining the objectives for the organisational need of information systems (Lederer & Sethi, 1988). McLean and Wetherbe (2004) advocated that the 'term enterprise resource planning is misleading because the business application or the software does not concentrate neither on planning nor on resources'. As Stratman and Roth (2002) argued, the core objective of ERP is to integrate all departments and functions of a company on one-station computer systems to serve organisational needs. ERP permits organisations to work around information systems structure and not vice versa. Therefore, the need of SISP is crucial even when using a predesigned information systems software package.

2.54 Chapter two summary

Strategic information systems' planning has been conducted for over two decades, over which time refinement and redirection has constantly occurred. Inadequate planning does not just cause IS failure, as has happened in some companies in both the developing and developed world, but also results in implementation errors and operational issues that can sometimes be fatal to organisational performance. IS planning should be put into its context to allow a better fit between the organisational strategy and IS; this can be done through a rigorous planning process. In addition, the involvement of key stakeholders is important rather than having the CIO or technology department acting alone, as this will improve the chance of SISP success. SISP success needs to be measured to ensure that when organisations decide to use SISP, they at least have an indication to ensure planning and implementation will result in some degree of success; in this way, organisations will be able to identify and correct problems before additional costs are incurred. The use of SISP usually follows fluctuations in the economy; thus, it is dynamic in nature, and the SISP process should be adaptable to such change to find the perfect fit between IS strategy and business strategy.

No model to date has solved the IS-business alignment problem, and both academics and practitioners are trying different models and techniques. Most of today's private and public organisations face challenges such as tough competition and the need to improve the efficiency and effectiveness of their businesses, as well as the scarcity of resources, especially in the current economic setting. SISP provides ways to increase efficiency and profits, and maximise available resources that may not have been used to their full extent. This can be done through producing an IS plan that encourages the right fit between IS and Business strategy. The author believes that adequate IS planning can be the solution to effective IS. The contingency theory of information systems provides appropriate concepts to test the strategic fit between organisational context, processes and success, since it represents a pattern of relationship between SISP components that is constructed from the core concept of strategic management research, which endorses the notion that the success of any new or altered planning programme will depend on a clear understanding of the context within which the plan will be implemented.

Chapter Three: Research Methodology

3. Introduction

This research methodology chapter is divided into two sections: The first concerns the general research methodology, while the second looks at the SEM statistical methodology. The first section focuses issues such as the research philosophy, generalisation issues, purpose of enquiry, research strategy, and use of theory and survey protocol, including sampling in general.

3.1 General research methodology

In this chapter, the author develops a methodology to guide the research throughout the investigation process of solving the research problem, answering the specific questions and testing hypotheses related to the problem, besides identifying a possible approach to collect data and techniques to analyse the data. Furthermore, the quality of the research is assured through a discussion of some related research methodology issues. Figure (13) represents general stages which this research will follow.

Figure 13: different stages of the research methodology

3.2 The research philosophy

The philosophy can be defined as 'the critical examination of the grounds for fundamental beliefs and an analysis of the basic concepts employed in the expression of such beliefs' (Dobson, 2002). As information systems research has evolved, a number of IS researchers have called for a clearer definition of its underlying philosophy (Vaishnavi & Kuechler, 2009). There are three important philosophical groundings that need to be clarified to design research. The first is the ontological stance, where research describes the nature of reality. Such research asks questions such as the following: What is real and what is not? What is fundamental and what is derivative? The second ground is the epistemological stance, which has to do with exploring the nature of knowledge. On what does knowledge depend and how can we be certain of what we know? The final ground is the axiological stance, representing the study of values. What values does an individual or group hold and why? It is worth reviewing the definitions of these philosophical grounds because although assumptions about reality, knowledge and value inspire any intellectual endeavour, they are usually implicit for most people, including researchers.

3.3 The ontological stance

In theory, ontology is a 'formal, explicit specification of a shared conceptualisation' (Tom, 1993). The ontological stance may present an overview of the domain related to a specific area of research and is used for browsing and query refinement, since it is concerned with the nature, origins and foundation of reality (Maria, 2007). Archer (1988) illustrated three ontological stances for management research: realism, idealism and internal realism. *Realism* holds that 'reality exists objectively and independently of the perceiving subject'. In this view, a suggestion or hypothesis would be correct if it linked with objective reality; however, the interpretation of this reality entirely depends on the cognition of the individual who is beholds it. In contrast, *idealism* is the opposite view to realism: It is an outcome of the cognition of the individual knowing subject'. However, it also represents the reality as an independent object. The third stance is *internal realism,* whereby the cognition of the knowing subjects is shared through common cognitive maps. Archer (1988) describes internal realism as 'considering reality as we know it to be a product, not of the cognition of the individual subject, but rather the cognition of the shared cognitive apparatus; thus it independent of the knowing subject'. SISP is neither a personal experience nor an independent object in itself; rather, it is an organisational process where people work together and share views and experiences. SISP is often characterised as a collective cognition of the way forward for an organisation with the goal of improving its information systems plan. The reality of SISP may be a result of the cognition of individual actors; however, there is a general view that SISP may not represent all of 'an' SISP experience as it known to the actors in the SISP process. This study endeavours to access the internal realism of SISP through the perceptions of the actors—'decision makers'—involved. The direct measurement of internal realism is not yet likely to be possible in this study; nevertheless, the internal realism this study seeks to access is the internal informants' reality, which encompasses the collective internal reality of SISP knowledge.

3.4 The epistemological stance

Relatively little attention has been given to the epistemological stance in information systems research; however, theories and concepts of information are vibrant in philosophy (Floridi, 2002), information science (Cornelius, 2002), social study (Avgerou & Land, 2004) and human context (Kling & Sawyer, 2005). Epistemology concerns the nature, foundation and source of knowledge. Gummesson (2000) stated that there are many perspectives on how an experiment can be observed, such as positivism and hermeneutics. Positivism is characterised via objectivity: The resource is not affected by any association to emotional, religious or political influences, and therefore will help the researcher to obtain knowledge about how something works rather than understanding why its acts the way it does (Bjorklund & Paulsson, 2003). The second stance is hermeneutics, a perspective which is more focused on people's interpretations and views on different subjects. Unlike positivism, which uses facts to explain relationships, hermeneutics uses more qualitative assessments and a more personal interpretive process (Gummesson, 2000)? Using hermeneutics, it is possible to analyse the way in which people understand by looking at their language. Andersson (1981) stated that hermeneutics reject the demands of positivism relating lack of bias, since this exists at all levels of the research process. On the other hand, following Archer (1988) and Bernd's (2007) debate about positivism and its alternatives in the field of information systems, three fundamental epistemological stances have emerged: positivism, non-positivism and normativism. The authors have argued about positivism in contrast with non-positivism, which is positioned to demonstrate that facts and values are intertwined and hard to separate. On the other hand, normativism is an epistemological stance where the fact-value difference is fully discarded and scientific knowledge is seen as predictably favourable to certain sets of social ends. This research views the SISP process as a social construction reflecting the values, both individual and collective, of the social factors involved. Thus, the epistemological stance is appropriate in this research is the non-positivist stance, since knowledge of SISP at the current stage of the subjects under development must include both facts and values.

3.5 Generalisation of the research

Generalisation is an assembly of more broadly appropriate propositions based upon the process of assumption from specific cases (Saunders, 2007). The generalisation issue is important in scientific research. As this study aims to achieve significant generalisation to Libyan (private and public medium to large) organisations, it will be useful to both theorists and practitioners. Here, the dominant method of inquiry employed is quantitative research. Therefore, the author needs to use a research sample, as it is not feasible to send questions to whole populations; however, the author wants the sample to be as representative as possible in order to be able to say that the results are not unique to the particular group studied. In other words, this research aims to generalise the findings beyond the collected cases to cover the sample of Libyan organisations as a whole.

The selection of an appropriate sample and achievement of sufficiently reliable results are important elements in this research. Walsham (1995) proposes four types of possible generalisation. These are as follows:

(i) The development of concepts;

(ii) The generation of theory;

(iii) The drawing of specific implications; and

(iv) The contribution of rich insight.

Whereas this study may help to understand and refine concepts, they should be drawn from existing SISP theory and not developed in any major way as part of the study. On the other hand, the study does aim to produce better theory and allow the drawing of specific implications about SISP in Libyan organisations.

3.6 Purpose of enquiry

Enquiry can be classified in terms of its purpose as exploratory or confirmatory enquiry (Robson, 2002). The first has a qualitative emphasis on theory building, where the enquiry that starts with assumptions and ends with possible theories about particular phenomena. The second involves quantitative-based enquiry emphasising empirical theory testing. The present research involves confirmatory enquiry testing and refinement of contingency theory in SISP with application to private and public Libyan organisations.

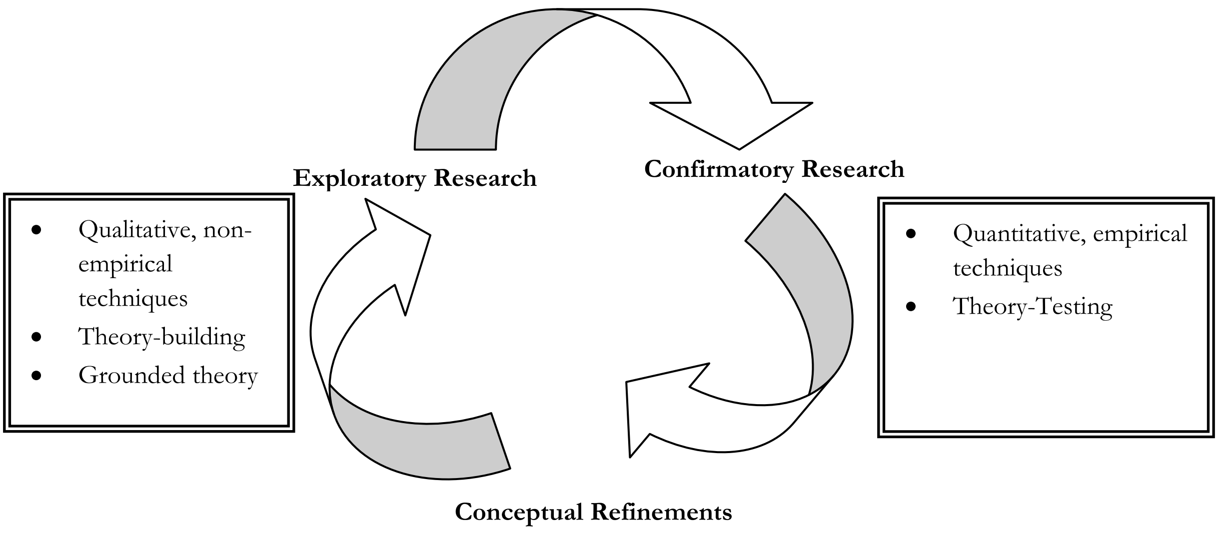


Figure 14: The research enquiry purpose (AIS, 2010)

3.7 The use of theory

According to Walsham (1995), 'a key question for researchers in any tradition, regardless of philosophical stance, is the concerns of the use of theory'. Eisenhardt (1989) identified three different uses of theory in organisational research:

(i) As a guide to research planning and data collection;

(ii) As part of an interactive process of data collection and analysis with the initial theory being expanded, revised or abandoned altogether; and

(iii) As a final product of the research.

In this study, theory will be used both as a guide to research planning and data collection and as part of an interactive process of data collection and analysis with the initial theory being expanded, revised or abandoned.

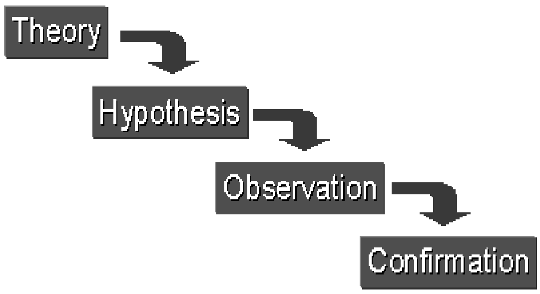


Figure 15: the use of the theory (AIS, 2010)

3.8 Research strategy

According to Saunders (2000), the research strategy is the general plan of how the researcher will go about answering the research questions. Saunders also suggests that there should be a distinction between strategy and tactics: Strategy is 'concerned with the overall approach adopted in the research to guide the research through answering the research questions, while tactics are the finer detail of data collection and analysis' (Saunders, 2000, p. 92). The strategy adopted in this research is triangulation strategy. The extension of the idea of triangulation beyond its conventional association with research methods and designs comes from Denzin (1970), who distinguished the following four forms of triangulation:

(i) Data triangulation, which entails gathering data through several sampling strategies, so that slices of data are collected from a variety of people at different times and in different social situations;

(ii) Investigator triangulation, which refers to the use of more than one researcher in the field to gather and interpret data;

(iii) Theoretical triangulation, which refers to the use of more than one theoretical position in interpreting data; and

(iv) Methodological triangulation, which refers to the use of more than one method for gathering data.

The data triangulation will occur in the quantitative data collection, where the data collection will be divided into two rounds. The data collected in the first round will be assessed for its validity and reliability, and the results will be used to modify the survey instrument. This will in turn be administered to complete the required data sample; similar to the first round, this round will involve assessment of the results for its validity and reliability.

3.9 Research design

The research design will follow structural equation modelling (SEM) as statistical technique to design the research method, starting with the operationalisation of variables emerging from the contingency theory of information systems to instrument development, ending with the analysis of the path model, which will allow hypotheses in the theory under investigation to be confirmed or rejected.

3.10 The research approach

Deciding on a research approach is an essential stage that concerns the direction of data collection and is ultimately crucial to the outcomes of the research. According to Saunders (2000), there are two types of research approach: inductive and deductive. The inductive approach represents the formation of a generalisation derived from the examination of a set of particulars, while the deductive approach involves the identification of an unknown particular, drawn from its resemblance to a set of known facts (Rothchild, 2003). Moreover, Saunders (2000) has discussed the difference between the two approaches in term of their relation to the theory: The inductive approach involves collecting data and developing theory as a result of the data analysis, while in the deductive approach, the researcher develops theory-based hypotheses and designs a research strategy to test them.

When searching for answers to the research questions there are basically two approaches to apply: the structured approach and the unstructured approach. The structured approach is deductive, and is often classified as quantitative research, while the unstructured approach is inductive, and is often classified as qualitative research (Saunders, 2000; Kumar, 2005). Quantitative research data are quantified and expressed in numbers; when they follow this approach, researchers in social science usually collect data using a questionnaire survey (Loseke *et al.,* 2007).

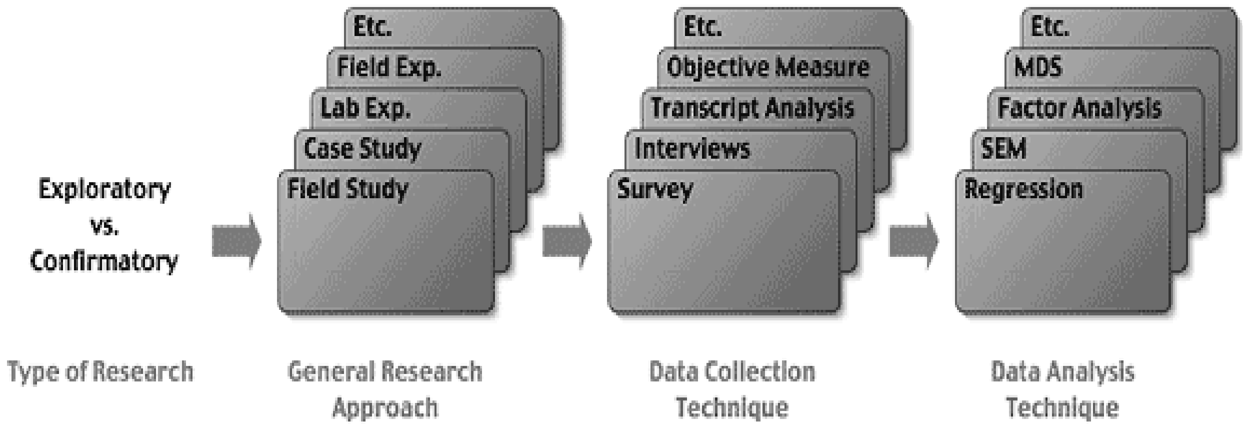


Figure 16: The processes of research enquiry (AIS, 2010)

As stated above, this study is confirmatory rather than exploratory; thus, the deductive approach will be appropriate to test contingency theory in relation to SISP in Libyan organisations. Robson (1993) has identified five sequential stages through which deductive research progresses:

(I) Deducting a hypothesis from the theory;
(II) Expressing the hypothesis in operational terms;
(III) Testing the operational hypothesis;
(IV) Examining the specific outcome of the inquiry; and
(V) If necessary, modifying the theory in the light of findings.

To employ a research strategy that would answer the research questions, a survey-based quantitative methodology was selected. This decision was based on the research approaches and how these techniques will gather data to answer the research question and meet the investigation objectives. The method selected is an excellent tool for identifying contingency effects, especially if used with the right analytical tool. Therefore, inappropriate techniques were omitted (Rui, 2008).

Table 10: survey research study – design and methods, sage publications, Yin (2003).

Techniques	Type of research question	Control Over event	Interaction
Survey Study	Who, what, where, How many/much	NO	None

3.11 Surveys as a data collection technique

There are two forms of survey (Phil, 2002), the analytical survey and the descriptive survey. An analytical survey aims to test a theory, whilst the descriptive survey seeks to identify the characteristics of a specific population. Both are concerned with ensuring that the sample used for the survey is representative of the population. The survey type used in this research is the analytical survey.

3.12 Survey design and implementation

Administering surveys that produce accurate information and reflect the views and experience of a given population requires the development of procedures that minimise all types of survey error (coverage, sampling, non-response and measurement error) (Dillman *et al.*, 2009). These types of error are described in the following:

i. Coverage error occurs when not all members of the population have a known, nonzero chance of being included in the sample for the survey and when those who are excluded are different from those who are included in terms of measures of interest. This is the case with internet surveys, as a significant number of people in many populations do not have access to the internet, or when the list from which the sample is drawn does not include everyone in the population.

ii. Sampling error relates to the power of sampling. Estimates of acceptable levels of precision can usually be made for the population by randomly surveying only a small portion of individuals (this is discussed further in the sampling section).

iii. Non-response error occurs when the characteristics of the non-respondents differ from those of the respondents. Response rates are typically around 20%. A variety of tactics can be employed to encourage responses: (1) ensuring that the topic is of interest to those within the sample frame, (2) offering inducements such as gifts or money and (3) following up the survey with follow-up letters and calls reminding those surveyed of the need to return the questionnaire and re-enforcing the importance of the survey (Gillpatrick, Harmon, & Tseng, 1994; Angur & Nataraajan, 1995).

iv. Measurement error occurs when a respondent's answer is inaccurate or imprecise. This is often the result of poor question wording or design and other aspects of questionnaire construction.

3.13 Sampling procedure

Sampling procedure is a principle part of the research design, and determines the accuracy and generalisability of the survey results. The sampling procedure in this research follows a process of identifying the sample type, defining the population, identifying the sampling frame, determining the sample size and selecting respondents and units of analysis (see Figure (17)).

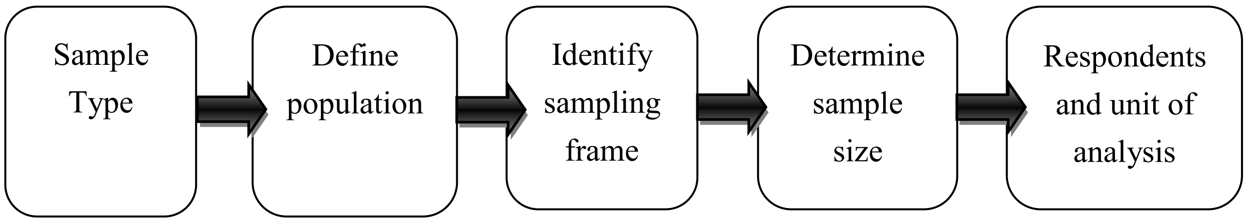


Figure 17: Sampling procedure.

3.14 The type of sample

Broadly speaking, there are two types of sampling: probability and non-probability sampling (Trochim, 2000). Alternative are the random and non-random samples. A random sample may have a finite probability of not representing the population. Certainly, the more randomly samples are taken, the less likely they are to be non-representative; this increases the strength of the justification of the results. There are several types of random sampling, including simple random sampling, stratified random sampling, theme sampling and systematic sampling (Alan, 2008). These are described below.

(I) Simple random sampling involves taking a random sample directly from the population. However, this is limited by whether a complete list of the population is available; this could be very large and not feasible or even possible to obtain.

(II) Stratified random sampling consists of taking random samples from various strata, which are different sub-populations within a larger population. By defining strata, the researcher can identify more relevant groups that are worth investigating.

(III) Theme sampling is randomly selecting subjects according to specific themes of subjects, thus avoiding the difficulty of sampling from a large population.

(IV) Systematic sampling is an extension of theme sampling and involves successive random selections from each previously selected theme. Non-random sampling provides less justifiably representative samples; however, it can be used for the sake of cost efficiency and convenience.

Typical techniques that have been applied in previous research are quota sampling, convenience, and snowball sampling (Alan, 2008). These are described below.

1. Quota sampling involves the non-random selection of subjects from identified strata until desired numbers are reached. Such an approach ensures that each group is about the same size, which can be important for some inferential statistical tests. The disadvantage of this approach is that the numbers may not reflect the true proportions of sub-populations in the whole population.
2. Convenience sampling involves choosing a sample that is available to the researcher by virtue of its accessibility.
3. Snowball sampling involves the researcher's identification of a small number of subjects with the required characteristics, who in turn identify others, etc. This is of value when a researcher has little idea of the size or extent of a population, or when there are no records of population size. The disadvantage is that it is difficult to defend the representativeness of the sample. Indeed, there is widespread recognition among organisation researchers that using probability samples. In this research, the sampling type adopted is random stratified sampling, because (a) stratification will always achieve greater precision provided that the strata have been chosen so that members of the same stratum are as similar as possible in terms of the characteristic of interest; (b) it is often administratively convenient to stratify a sample; (c) this ensures better coverage of the population and generalisation than simple random sampling; and (d) most statistical analysis requires normally distributed data, and this is especially the case since the present analysis will employ SEM.

3.15 Population

Although strategic information systems planning can exist in any type or size of organisation as long as it has an information systems department and a financial commitment to IT development, the population of interest in this research is medium to large private or public organisations in Libya; this is because the information systems strategy within small businesses is usually explicit and easy to identify, and thus it would not be worth the time and effort of investigation to look at them. The criteria used to differentiate companies' populations were developed from the pilot study, where the author found that sometimes companies are large or medium in terms of their employee number but did not necessarily have a large IT department or commitment to IT development. As a result, the role of SISP would not be worth investigating in such companies. Thus, two criteria were selected to differentiate company populations: the number of IS/IT employees and total annual spending on the IS/IT department. Small firms were defined as having 1–6 IT/IS employees and spending less than $1,000; medium firms have 6-12 IT/IS employees and spend $1–10,000 total annual spending;

finally, large firms have over 12 IT/IS employees and spend over $10,000 on the IS/IT department annually.

3.16 Sampling frame

The sample frame is the set of people (or organisations) that have a chance of being selected in the research. Any generalisations that are made from a research study can only be statistically applied to the population included in the sampling frame. The sample frame therefore needs to be the closest practical match to the population being investigated within the study. Here, the objective is to specify a sample frame that represents private and public, large and medium-sized organisations in Libya. In practice, this meant finding a database that was itself a large sample of this frame, or several databases that together covered the sample frame; thus, the sample frame was drawn from six different databases, as follows:

(I) Libya Yellow-Pages is the official, largest company database available in Libya today; this is belong to Libyaonline.com;

(II) The second largest company database used is the Libya Directory; this belongs to a private company called Libyanspider.ly;

(III) Libyan Central Bank;

(IV) Libyan Stock Exchange;

(V) General public committee ('GPC.gov.ly); this is the official Libyan government website; and

(VI) Libya Society for Computer and Information (LSCI).

Libya Yellow-Pages will be used as the main database in this research; however, if some companies are not listed in this database, the author will complete the missing information from other directories. The classification and organisation of a database to achieve the stratified random sample was derived from the above directories.

3.17 Sample size

A common goal of survey research is to collect data that are representative of a population. The researcher uses information gathered from the survey to generalise findings from a sample back to a population, within the limits of random error; thus, the determination of sample size is very important to the research. In this study, the calculation of sample size will be based on the following steps to allow generalisation of significant results to the population of Libyan organisations (more details are given in the SEM methodology section).

3.18 Respondents and unit of analysis

A unit of analysis is the unit from which a researcher obtains information (De Vaus, 1993). Nunally (1978) suggested that the subjects should be those for whom the instrument is intended to seek feedback from. A unit of analysis can be individuals, groups, organisations or society. Since the main objective of this study is to investigate the inside reality of SISP in Libyan organisations (context, process and success), key individuals will be targeted as respondents to the survey, and these people will have responsibility for IS planning. Such individuals are usually the CEOs or CIOs of companies, but this not always the case; therefore, the survey respondents could be any company employees responsible for strategic decision making in terms of selecting information systems applications who would be able to give information about the organisational context and degree of success in and process of SISP. This criterion will be clarified at the beginning of the survey questions: If the informant is the right person to answer the questions, he or she will complete the survey; if not, the author will ask the respondent to withdraw from the survey. Extra effort will be made to ensure that the people who answer the survey are the main source of information, and such individuals will be selected to receive the questionnaire. Care has been taken to ensure that respondents will have access to the knowledge needed to answer the questions and the cognition needed to understand what is required in the responses, as well as the motivation to answer the questions accurately.

3.19 Issues to be considered when crafting survey questions

Three important issues need to be considered when designing a survey and crafting questions (Dillman, 2009); these are the following:

- What survey mode(s) will be used to ask the questions? How one writes a survey question should depend strongly on how that question is going to be delivered to respondents. The key point to keep in mind here is that different survey modes rely on different communication channels. In telephone interviews, respondents give and receive information through spoken words and hearing, whereas on the Web and in mail questionnaires, information is transmitted through the visual systems. As a result, words take on extra importance in telephone surveys, and memory becomes a significant factor to be considered. In mail and Internet surveys, visual design elements become important.
- Is the question being repeated from another survey? The answer to this will influence how much, if any, the question can be changed. If a particular question has been used in another survey and the main objective is to replicate the previous questions, usually no changes or only minimal changes can be made.

- Will respondents be willing and motivated to answer accurately? Ensuring that respondents are motivated to respond to each question is a major concern in self-administered surveys because there is no interviewer present to encourage respondents to carefully select and report complete answers. Without proper motivation, respondents may ignore instructions, read the question carelessly or provide incomplete answers. Worse yet, they may skip questions altogether or fail to complete and return the questionnaire. In some instances motivational problems stem from poor question design, such as when questions are difficult to read and understand, instructions are hard to find, or the response task is too vague. In other instances, the question topic itself may be the source of motivational problems.

To invite people within the sample frame to respond to the survey, the personal approach suggested by Dillman (2009) has been adopted; the respondents will be reached by telephone and email contact. Once the author has collected a number of potential participants, a mail survey will be sent in a special package that includes the hard copy of the survey, a pen and a gift card thanking the participants in advance for their contribution. The gift card will be a ticket for a short, free training session that will be held in Tripoli to emphasise the importance of strategic information systems planning in Libyan organisations; in this session, results from the empirical findings of this work will be shared. Another phone call will follow the distribution of the survey to ask the potential respondents about any problem they might face filling out the survey and encourage them to respond. Due to the unreliable mail service in Libya, the researcher has elected to use a private company to send the surveys collect them in person.

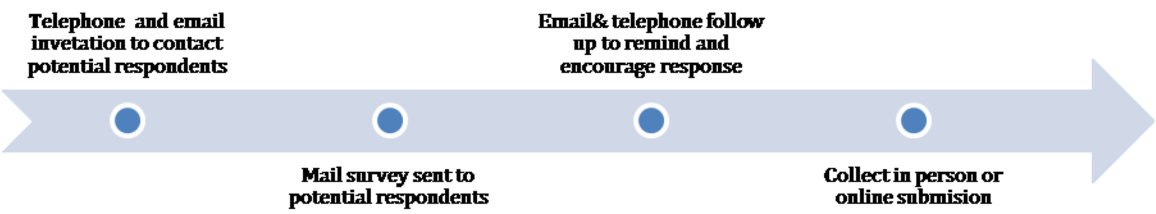


Figure 18: Stages in administrating the survey.

Dillman *et al.* (2009) stated that there are some motivations to use the mixed mode surveys, as these improve response rates and reduce convergence and non-response error. On the other hand, they increase design and implementation costs. In this research, both the design and implementation costs are high, as well the effort required to follow up and encourage participation at different stages of the survey administration, some participants are not familiar with survey techniques.

- **Survey invitation cover letter:** The goal of the cover letter is to provide certain critical pieces of information in a relatively brief manner, preferably within one page. Dillman *et al.* (2009) identified 13 kinds of information that should be considered for inclusion in a cover letter: (1) Sponsorship official logo, (2) date, (3) address, (4) salutation, (5) appeal for help, (6) statement of why the respondent were selected, (7) statement of who should answer and why, (8) clarification of the confidential and voluntary nature of participation, (9) contact information, (10) token of appreciation, (11) personal touch, (12) thanks and (13) a real signature. Some of this information may be incorporated within the questionnaire itself.
- **Cover Sheet:** The first sheet of the questionnaire needs to give the title of the survey and the name and address of the researcher or researching organisation, including the logo and a hint image related to the survey subject.
- **Instructions:** There are five sections included in survey instructions, which aiming to give respondents information about the survey, how to fill the questions and how to return the completed survey. These sections are as follows: (I) what is the survey about?, (II) how long will the survey take?, (III) returning the questionnaire, (IV) eligibility and (V) complimentary seminar.
- **The Length of the Questionnaire:** Obviously, the questionnaire should be kept as short as possible. Bourque and Fielding (1995) noted that most mail questionnaires range from 4 to 12 pages.
- **Appearance:** Extra attention needs to be paid to how the packaging of letter and survey will be received by the respondent, as the author thinks that the package's appropriate representation will encourage responses.
- **Measurement scales:** In this survey, the items are assessed by 5-point Likert scale, which is treated as an ordinal scale, where 1 represents a low score and 5 is a high score. However, another point has been added to the scale where respondents may respond that the item is not applicable ('NA') to the constructs under investigation. The aim of this addition is to eliminate missing data and give more reliability and validity to measurement scales.
- **Translation issues:** It is vital that the survey be translated because the sample population lives in an Arabic-speaking country. Although some managers in Libyan organisations have been educated in English, it would not be fair to conduct the survey in the English language alone. Two translation techniques were adopted to translate the survey from English to Arabic; it was first proof translated from English to Arabic through a legal translation service and then back translated to English through another independent translating service. The back-translated survey was then compared with the original survey (Susan, 2000). To ensure

that the survey did not lose meaning in the translation, the process had to be modified and adjusted throughout. The author and supervisor's knowledge of both languages played an important part in the validation of the translation process. However, to ensure a better understanding, both Arabic and English versions of the survey were sent to the participants.

- **Ethical issues in data collection:** Ethical approval of data collection was granted by the University of Plymouth, and the researcher signed an agreement to comply with the ethical code for data collection provided by the university.
- **Length of data collection:** Triangulation in data collection and following up non-respondents by mail and phone added to the length of data collection time. Tactics and skills in approaching respondent and motivate them to complete the survey had to be reviewed from time to time, especially when a deadline was given and schedules were made, the data collection took almost a year.
- **Costs:** Equilibrium measurement between the cost and some aspects of survey quality, such as the coverage of the sample frame and response rates, had to be carefully considered.
- **Protecting data:** Participants were guaranteed the confidentiality of their responses; this required restrictions on physical access to data, as well as coding the answers in the data analysis and reporting.
- **Computer support:** In this study, computer applications have been selected to help produce a better, more organised, presentable research thesis; thus, a number of computer-based applications have been used. For data analysis, the author used IBM SPSS 17 statistics with AMOS 17 for structural equation modelling, G-power 3.1 was used for the sample T-test and Mindjet was employed to plan and manage the research, as well to arrange mini case studies. The reference management application Endnote and online questionnaire software 'Questionpro' were used in addition to other core Microsoft Office applications, including MS Word, MS Project, MS OneNote, MS Outlook and MS PowerPoint.
- **Activities related to SISP research:** In order to get close to the real issues related to the research field, the author participated in a number of activities, such as becoming a member of professional bodies and associations, as well as generating discussion in special forums where many current SISP issues were discussed. These discussions contributed to the survey design and adoption of a protocol (the introductory letter, cover letter and survey questionnaire presented in the appendices). Careful consideration should be taken at every stage of implementing a research plan and collecting data. The next section will look at the SEM methodology for this research.

3.20 Structural equation modelling (SEM)

Structural equation modelling (SEM) is a statistical technique/method used to test a set of hypotheses constructed from pre-existing theory which represent 'causal' relationships among multiple variables (Bentler, 1988). Thus, it encourages confirmatory rather than exploratory modelling; hence, it is suited to theory testing rather than theory development. The term structural equation modelling does not designate a single statistical technique; instead, it refers to a set of techniques or procedures used to analyse data (Kline, 2005). To employ SEM, it is necessary to learn about many fundamental issues related to methods and general statistical concepts; the most important is the measurement of the constructs used in the model and the overall theory about how those constructs (latent variables) are related (Kline, 2005). The following points represent an overview of SEM:

(I) The general SEM model can be decomposed into two sub-models: a measurement model, and a structural model.

(II) The *measurement model* defines relations between the observed and unobserved variables represented by confirmatory factor analysis (CFA).

(III) The *structural model* defines the relations among the unobserved variables. Accordingly, it specifies the manner by which particular latent variables directly or indirectly influence (i.e. 'cause') changes in the values of certain other latent variables in the model.

(IV) Because it is highly unlikely that a perfect fit will exist between the observed data and the hypothesised model, differences usually exist between the hypothesised model and the data; this differential is termed the *residual.* Data = Model+ Residual.

(V) The primary task of the model-testing procedure (measurement or SEM) is to determine the goodness of fit between the hypothesised model and the sample data.

(VI) Visual representations of relations which are assumed to hold among the variables under study are called *path diagrams*.

3.21 Computing structural equation modelling

There are several computer programs for SEM that run on a personal computer; a total of nine such programs were found, specifically AMOS, R, SAS/STATA, EQS, LISREL, Mplus, Mx Graph, SYSTAT and STATISTICA. The author reviewed AMOS, R Statistic and EQS; out of these programs, AMOS 17 from IBM-SPSS Statistics was selected in this research for various reasons, including the availability of the programme and training in its use. The author attended a week-long course on AMOS at the University of Southampton, and found it to be convenient and beneficial to the statistical analysis in the research. AMOS runs on Microsoft Windows and is made of two core models: Amos Graphics and Amos Basic. In Graphics, it is easy to sketch the model in a user-friendly drawing environment. AMOS then translates the drawing to a written program and performs the necessary calculations. On the other hand, in Amos Basic, the model is written in the Visual Basic or C+ computer programming language; if the analysis is continued, Amos Graphics can display estimates in the model diagram. Amos Graphics also has extensive capability for more exploratory analysis. AMOS fits the model to the data, using every possible subset of optional paths. Another special feature of AMOS is the capability to generate bootstrapped estimates of standard errors and confidence intervals for all parameter estimates (Byrne, 2010).

3.22 Common characteristics and basic concepts in the SEM method

The following points represent common characteristics of structural equation modelling when used as part of a research methodology:

(I) SEM is used for theory testing and requires researchers to think in terms of models as a whole.

(II) SEM distinguishes between observed and latent variables to test wider hypotheses.

(III) The basic statistic in SEM is covariance.

(IV) It is a flexible analytical tool that can be applied to data from experimentation.

(V) Many standard statistical procedures, including multiple regression, correlation and analysis of variance (ANOVA) can be viewed in the SEM output.

(VI) SEM is a large sampling technique, but there have been recent suggestions in the literature regarding the use of small samples in SEM (Kline, 2005).

3.23 Basic concepts

It is important to point out some basic concepts that will be salient to this research when using SEM as methodology. These are discussed below.

3.24 Exogenous *versus* Endogenous latent variables

It is useful to distinguish between latent variables that are exogenous and those that are endogenous. An exogenous variable is one that is not caused by another variable in the model. Usually, this variable causes one or more variables in the model. In contrast, an endogenous variable is caused by one or more variables in the model; however, an endogenous variable may also cause another endogenous variable in the model (Stacie, 2007; Bonito, 2010).

3.25 Exploratory factor analysis *versus* confirmatory factor analysis

The oldest and best-known statistical procedure for investigating relations between sets of observed and latent variables is factor analysis (Byrne, 2010). There are two basic types of factor analyses: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA is designed for situations where the links between observed and latent variables are unknown or uncertain. The analysis thus proceeds in an exploratory mode to determine how and to what extent the observed variables are linked to their underlying factors. Normally, the EFA approach is considered when the researcher has no prior theoretical knowledge about what items can measure the construct under analysis (Byrne, 2010). In contrast, CFA is used when the researcher has some knowledge of the underlying latent variable structure based on knowledge of the theory. In CFA, the researcher specifies the number of factors and the pattern of indicator-factor loading in advance (Timothy, 2006). EFA and CFA often rely on the same estimation methods; the most common is the maximum likelihood (ML) method (Timothy, 2006). Both EFA and CFA show how, and the extent to which, the observed variables are linked to their underlying latent factors. More specifically, they are concerned with the extent to which the observed variables are generated by the underlying latent constructs, and thus the strengths of the regression paths from the factors to the observed variables (the factor loadings) are of primary interest (Byrne, 2010).

3.26 Latent *versus* Observed variables

Latent variables, or *factors*, are not directly observed, but are rather measured through a mathematical model using other indicator variables that are observed and directly measured. Mathematical models that aim to explain observed variables in the form of latent variables are called latent variable models. On the other hand, for observed or *manifest* variables, they serve as indicators of the construct they represent (Byrne, 2010). Some standard statistical procedures do not offer a convenient way of differentiating between observed and latent variable. For example, ANOVA and multiple regressions are concerned with the means and inter-correlations among observed variables, but neither offers a straightforward way to test hypotheses at a higher level of abstraction (Kline, 2005).

3.27 Steps in structural equation modelling (SEM)

Most SEM literature holds a common consensus that there are certain steps to be followed when applying SEM in social science as a research methodology. These steps are the following: (I) model specification, (II) model identification; (III) select constructs measurement, (IV) model estimation, (V) model adjustment, (VI) model fit and (VII) Model interpretation (Schumacker & Lomax, 2004; Byrne, 2010; Klein, 2005; Niels, 2008, Hair, 2010). The initial methodological adopted model for this study is represented in below; it has two phases, as shown in Figure (19). The first phase occurs prior to data collection and the other occurs after data collection.

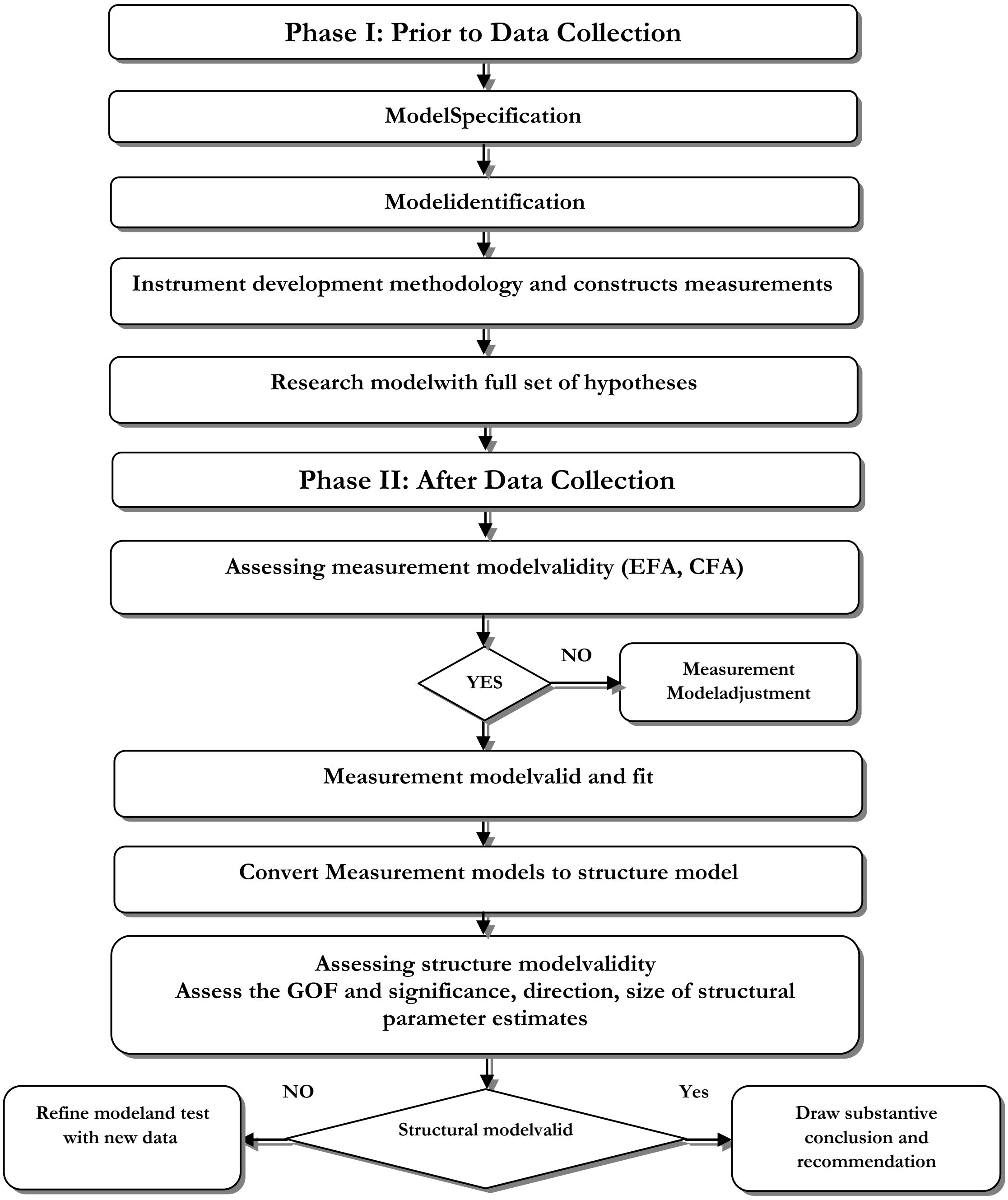


Figure 19: SEM methodology for this research.

3.28 Phase I: Prior to data collection

The first step in the SEM method is to specify the research model and where the model originates; in confirmatory research, 'theory testing' of the model usually draws upon an underlying theory that defines the model constructs' relationship and hypotheses in form of SEM (Klein, 2005). This research is based upon the contingency theory of information systems.

3.29 Conceptual model of the research

This research employs conceptual blocks of contingency theory in MIS for SISP research. While the SISP domain is constructed from social concepts such as strategy, success, process and organisational context, these are as much commodities of human cognition as of organisational reality. This study has adopted concepts within the domain of SISP in accordance with the contingency theory of information systems. As Cavana *et al.* (2001) suggested, this process allows the theory to be broken down into constructs that can be measured and operationalised in a tangible way. The contingent relationships between organisational context, planning processes and performance are not just a commodity of the contingency theory of information systems, but rather lie at the centre of strategic management theory (Yasai-Ardekani, 1997). The planning process intervenes between context and performance. Constructs in this study are derived from the contingency theory of MIS (Weill *et al.*, 1989), as discussed in detail in chapter two.

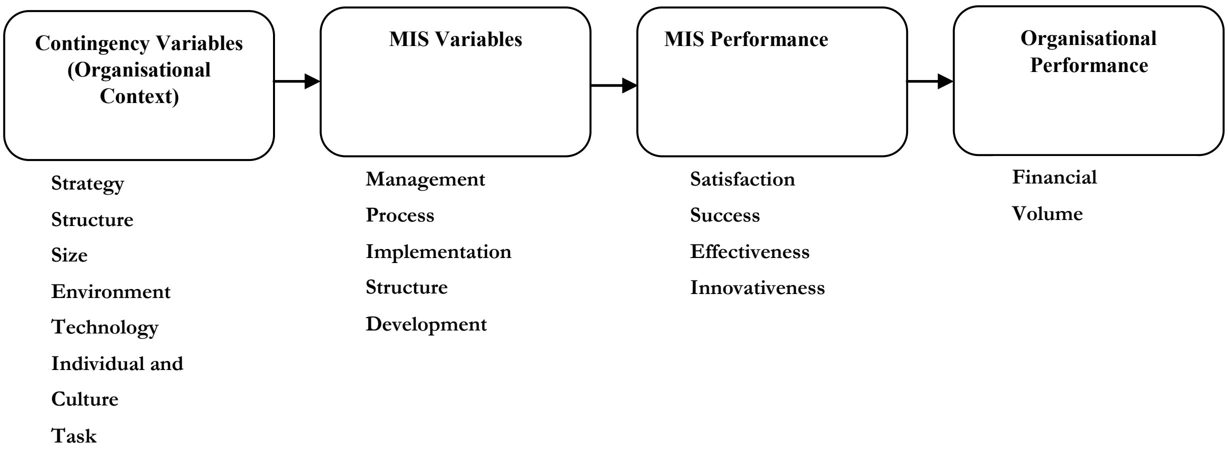


Figure 20: The contingency theory of Information systems general.

The basic principle of the contingency theory in MIS is that the outcome of the MIS is contingent upon the indirect effect of organisational context, which affects the management process, and the management process in turn directly affects MIS performance. In this study, the author is concerned with fitting the strategic information systems planning constructs into the contingency theory of MIS. From the literature review and SISP construct development; the author has identified three major constructs in SISP: SISP context, SISP process and SISP success. These fit perfectly into the contingency theory in MIS; therefore, the theory is applied to shape the relationship among the three SISP constructs.

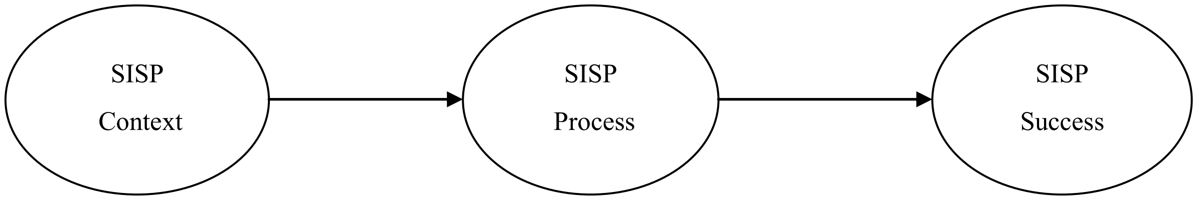


Figure 21 : The research constructs as emerged from the contingency theory.

Below, the author will address each construct separately to develop the construct measurement which will be used in the research.

3.30 'Fit' models in strategic information systems planning

The fit-based relationships model in this research is a reflection of Venkatraman's (1989) models of 'strategic fit', which reflects the theory subject to study (contingency theory) and has been applied in prior MIS and SISP research studies (Grover, 2004; Alan, 2004; Bergeron, 2004; Dong, 2008). Venkatraman's (1989) work on the 'fit' concept provides a solid theoretical foundation applicable in the field of strategic management and SISP research. He defined the strategic 'fit' perspective in six different forums and provided criteria to select the fit relationship type as appropriate. The criteria are shown in Figure (22).

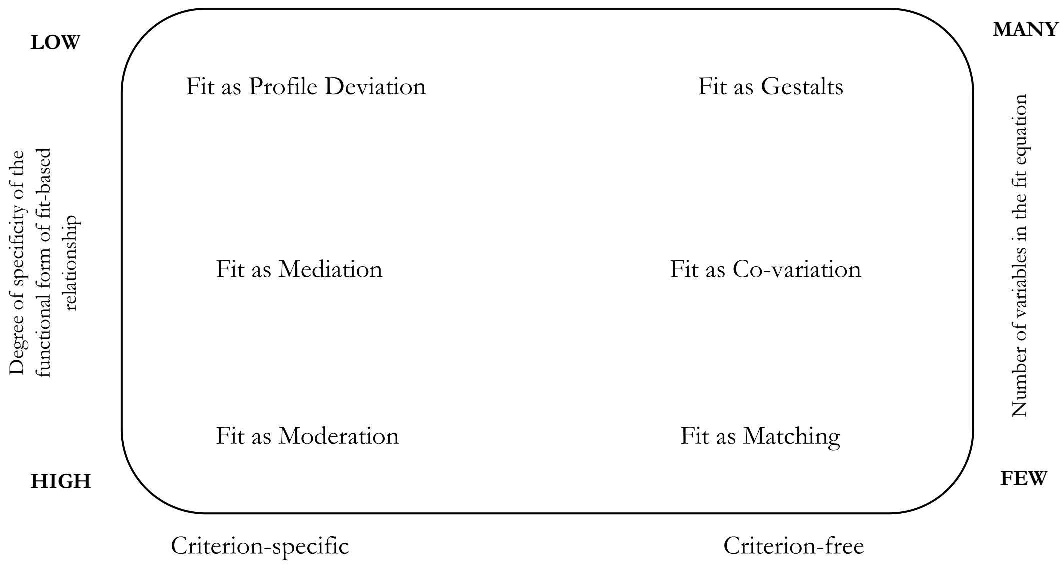


Figure 22: Choice of the specification of fit-based relationships, Venkatraman (1989, P 425).

This research faces two fundamental decisions. The first is to decide on the degree of specificity of the theoretical relationship(s), which indicates the level of accuracy in the functional form of 'fit'. The second decision is either to fit the model to a particular criterion or to adopt a criterion-free specification. In this research, the criterion variable is SISP success and the degree of specificity of the functional form of fit is in the middle because if the data do not accurately fit the model, then the model may be modified for better fit. Therefore, the specification that best suited this research was fit as a mediation specification set. In elucidating their research model, Hair *et al.* (2010) suggested three specifications for modelling strategies in SEM. These are as follows:

(I) The alternative models approach;

(II) The strict confirmatory approach; and

(III) The model-generating approach.

The alternative models approach does not specify a particular model to follow, but rather is open for emerging models based on alternative theoretical frameworks that may provide a better fit (Hair *et al.*, 2010). In the present research, the author rejects this strategy on the basis of the nature of the research, which encourages confirmatory theory testing. The second strategy is the strict confirmatory approach, where the researcher decides on a single model and statistical measurement using SEM is applied to assess the model's statistical significance, after which the model is either accept or rejected with no further modifications to improve the fit (Byrne, 2010). It is not logical for this research to adopt such a strategy, as author the seeking a model to fit data collected from a particular region under contingency theory, which fundamentally suggests that there is no one model to fit all organisational setting. The last strategy is the model generating approach; here, the components (latent and observed variables) in the initial model are set to be modified and improved to fit the sampling data through separate measurement models that are components of the structural 'path analysis' model(Kline, 2005; Hair *et al.*, 2010). This strategy is most commonly used in the SEM research method (Kline, 2005; Byrne 2010; Hair *et al.*, 2010). After reviewing the different 'fit' models using the criteria of strategic management 'fit', as suggested by Venkatraman (1989), the 'fit' as mediation approach will be adopted in this research with a model development capability in which a modified mediation model will be applied to best suit sample data and develop an estimated model for successful SISP in Libya.

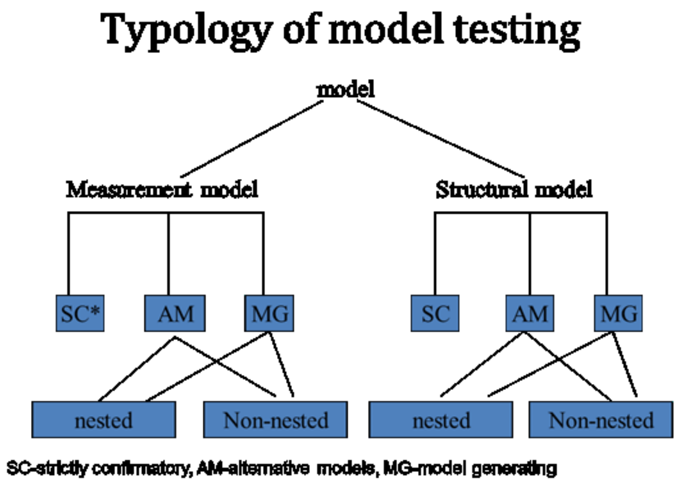


Figure 23: Typology of SEM testing.

3.31 'Fit' as mediation

Mediation or an indirect hypothesises measures how, or by what means, an independent variable (X) affects a dependent variable (Y) through one or more potential mediators (M) (Preacher & Hayes, 2008). Therefore, the result of mediation is a type of analysis that permits examination of processes, allowing a researcher to examine the causal effect of an independent variable X (SISP context) on a dependent variable Y (SISP success) through a mediator M (SISP process). In Other words, X affects Y because X affects M, and M, in turn, affects Y (MacKinnon, 2000; Preacher *et al.*, 2007).

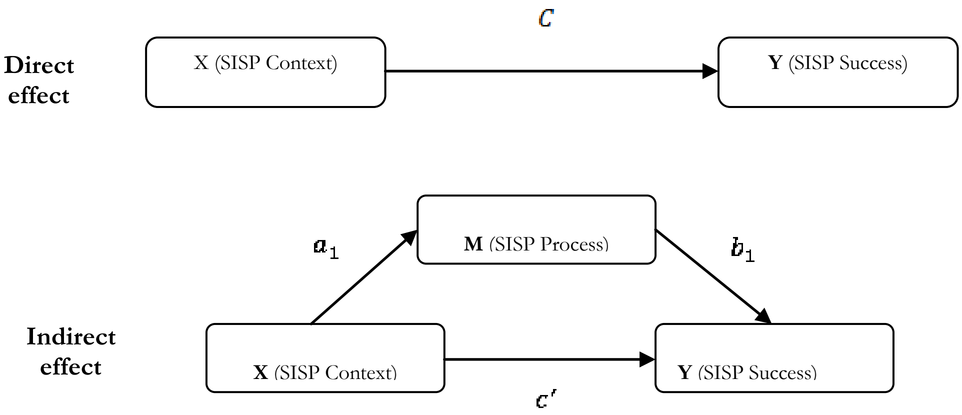


Figure 24: "Fit" as mediation for the relationship between SISP (Context, Process and Success).

The mathematical representation of the mediation model is as follows:

$$Y = b_0 + c'x + b_1 m + e \quad And \quad M = a_0 + a_1 x + e$$

Y = criterion variable, M = predictor variable and x = situation variable.

Here, a_1 Refers to the (un-standardised) slope coefficient of M regressed on X, and b_1 and c' indicate the conditional coefficients of Y regressed on M and X, respectively, when both are included as simultaneous predictors of Y. Furthermore, c represent the effect of X on Y in the absence of M, the indirect effect is traditionally quantified as $c - c'$, which is ordinarily equivalent to $a_1\ b_1$ (MacKinnon, Warsi, & Dwyer, 1995). The coefficients described here are commonly obtained using least squares regression. Specifically, coefficients a_1 and b_1 may be obtained from the regression equations, where a_0 and b_0 are intercept terms and e is a regression residual. The coefficients a_1 and b_1 are then used to assess the attendance, strength and significance of the indirect effect of x on y via m. This study has multi-dimensional latent variable as the mediator (SISP process); therefore in the following discussion the author will specify multiple mediator indirect effects and review the different approaches available to assess total and specific indirect effects.

3.32 Specifying indirect effects in multiple mediator models

Preacher *et al.* (2008) stated that 'A design that has received less attention in both the methodological and applied literature involves simultaneous mediation by multiple variables or multiple-mediation'. They suggested that this is because the complexity of the analysis method involved, although advocates for this method (e.g. Bollen, 1989; Brown, 1997; MacKinnon, 2000; Cheung, 2007) have put enormous effort into testing multiple indirect effects, and made the potential uses for such methods clear and abundant. In the domain of strategic information systems planning, the only study found that used this method was by Lederer *et al.* (2008), who tested the multiple-mediation of SISP dimensions that they originally developed as mediation between strategic information systems planning horizon and information systems alignment. However, the model specification in this research was incomplete, as it did not include the direct effect in the multiple-mediation model. The following model explains the specification of indirect effects in multiple mediator models, which later will be adopted in a path diagram that elucidates the model in this research.

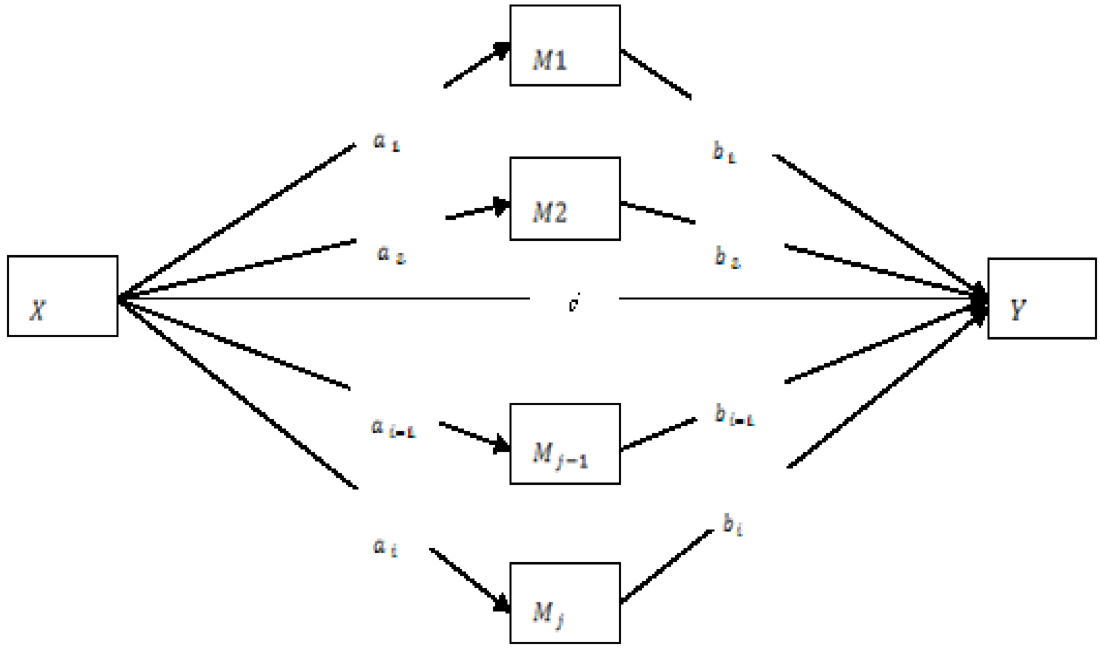


Figure 25: Multiple mediation modelwith j mediators

The model above represents both the direct effect of X on Y (path c') and the indirect effect of X on Y via the j mediators. The specific indirect effect of X on Y via mediator$i$, where i is defined as un-standardised of the two un-standardised paths linking X to Y via the mediator. For example, the specific indirect effect of X on Y through M_1 is quantified as a_1b_1. The total indirect effect of X on Y is the sum of the specific indirect effects:$\sum_i(a_i b_i)$ *where* $i = 1$ to j. Furthermore, the total effect of X on Y is the sum of the direct effect and all j of the specific indirect effects: $c = c' + \sum_i(a_i b_i)$ and $i = 1$ to j The total indirect effect can also be calculated as $c - c'$. In this research, there are several advantages to specifying and testing single multiple-mediation models, as suggested by Preacher *et al.* (2008), rather than testing the effect in separate simple mediation models. First, testing the total indirect effect of X on Y is equivalent to conducting a regression analysis with several predictors, with the aim of determining whether an overall effect exists. Second, it is possible to determine the extent to which a specific M variable mediates the X (Y) effect, conditional on the presence of other mediators in the model. Third, when the measurement model omits some of the construct indicators, it will have less of an effect on the overall bias of the construct when using multiple mediators. Fourth, including several mediators in one model allows the researcher to determine the relative magnitudes of the specific indirect effects associated with all mediators, and gives better determination of the causal relationship.

Including multiple mediators in the same model is one way of distinguishing between the components of a theory within a single model since, as Preacher *et al.* (2008) stated; theory comparison is good scientific practice.

In testing the multiple-mediation model, Preacher *et al.* (2008) suggested that the investigation should contain two measures:

(I) The first measure should investigate the total indirect effect and determine whether the set of mediators conveys the effect of X to Y or not.

(II) The second measure is testing the hypotheses regarding individual mediators in the context of a multiple mediator model. As Preacher *et al.* (2008) comment, 'We do not suggest that a significant total indirect effect is a requirement for investigating specific indirect effects. It is entirely possible to find specific indirect effects to be significant in the presence of a non-significant total indirect effect' (2008).

3.33 Strategies for assessing indirect effects in multiple mediator models

MacKinnon and colleagues (MacKinnon *et al.*, 2002; MacKinnon et al., 2004, Preacher *et al.*, 2007) evaluated a selection of strategies to assess the degree and the implication of indirect effects. They found that the most common of these strategies are the causal steps strategy (CSS), the distribution of the product strategies (DPS), bootstrapping strategies (BS) and various products of coefficients strategies (CPCS). However, MacKinnon *et al.* (2002) stated that the CSS suffers from low power of analysis results; therefore, author will exclude this as an alternative to the remaining two strategies. On the other hand, the DPS is perhaps the most accurate analytical method to determine the significance of confidence intervals (CIs) in simple indirect mediation effects (MacKinnon et al., 2004). Considering this method in multiple indirect effects as proposed in this research will involve extensive analytical work and programming, since multiple indirect effects are more complex than simple mediation effects. Therefore, this research will suggest bootstrapping strategies, for the reason mentioned above because AMOS 17 implements the percentile bootstrap method for total indirect effects in simple and multiple mediator models (Blunch, 2008).

3.34 Bootstrapping

A growing literature now advocates the use of bootstrapping for assessing indirect effects (MacKinnon *et al.*, 2004; Preacher & Hayes, 2004). Preacher *et al.* (2007) stated that bootstrapping methods are preferred over methods that assume regularity or normality of the sampling distribution of the indirect effect. In bootstrapping, the sample is considered as a population; from this population, bootstrapping takes, e.g. 500 samples from preferably at least

1,000 (Preacher *et al.*, 2007; Blunch, 2008). Therefore, the bootstrapping method magnifies the effect of unusual features in a dataset (Kline, 2005). The choice between freely estimating and constraining the mediator residual covariances to zero does not affect the validity of inferences when using a bootstrapping approach (Preacher *et al.*, 2007). In this research, the author will use the bootstrapping technique with AMOS 17 set at 2,000.

3.35 Model identification

Model identification refers to the degree to which a unique set of parameters is consistent with the obtained data (Byrne, 2010). In SEM, it is crucial that the researcher resolve identification problems prior to the estimation of parameters. Identification refers to measurement models with no unique solution (Loehlin, 2004). The following mathematical example illustrates model identification: $2x + y = 7$. This equation has no unique solution, as there are an infinite number of solutions to solve it. Thus, this equation would not be identified. However, in the following equations, there is a unique solution for x and y where: *(x=4, y= -1)*

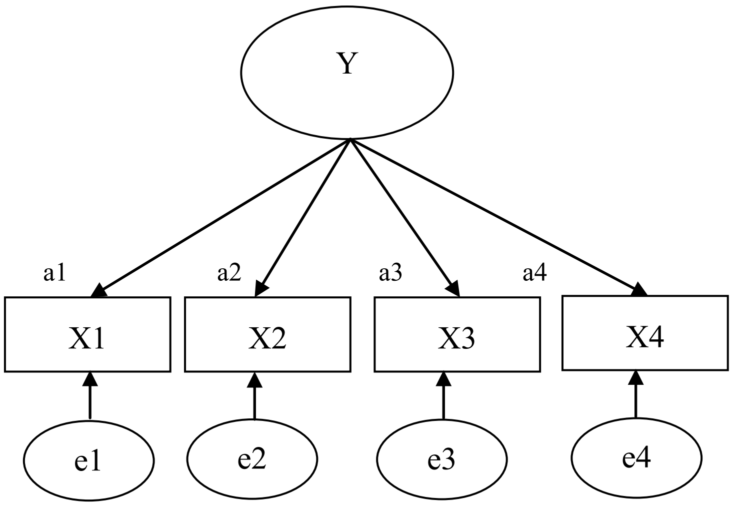
$2x + y = 7,\ x - 3y = 7$.

Traditionally, there have been three levels of model identification (Schumacker & Lomax, 2004). A model can be (1) over-identified, (2) just-identified or (3) under-identified. If the measurement model is either just identified or over-identified, then the model is identified (Schumacker & Lomax, 2004). The primary goal is to have a model that is over-identified (Hair *et al.*, 2010). The order condition and rank condition are some of the necessary rules which can be used to assess the identification of a model (Schumacker & Lomax, 2004; Kline, 2005; Hair *et al.*, 2010). Under the order condition, the degrees of freedom must be $(df_M \geq 0)$ greater than or equal to zero. The df is indicator for model identification whether it is over, just or under identified (Kline, 2005).

The rank condition requires each unobserved variable (latent variable) to be assigned a scale (indicator). Hair *et al* (2010) recommended using two 'rules' in constructing identification. The first is the three-measure rule, which emphasises that any construct with three or more indicators will always be identified. The second is the recursive model rule, which asserts that recursive models, with identified constructs (using the three indicator rule) will always be identified. However the model identification equation represented by df_M does not have much value if the construct is not correctly specified. To specify the construct, one should ask: Is the construct model 'equation' a reflection of the theoretical meaning of this construct? In other word, does this create a reflective or formative construct? The author has to be careful with the concepts behind the construct and translate them into a correct, measurable format.

3.36 Reflective *versus* Formative latent constructs

There are two types of latent constructs in management information systems research: reflective and formative constructs. The structural relationships among latent constructs are frequently recognised by statistically relating covariation among latent constructs and observed variables or indicators (Borsboom *et al.,* 2003, Petter, 2007; Bongsik *et al.,* 2011). Latent constructs can define unobservable phenomena (e.g. SISP success) and are intended to quantifiably measure a phenomenon by relating the observed score captured by indicators that have been collected through self-report or some other means (Edwards *et al.,* 2000). The indicators influenced by (reflecting) or influencing (form) latent variables (Bollen *et al*., 1991; Timothy, 2006). Indicators that are influenced by latent variables are called 'effects' indicators. The measurement models that validate these indicators and their latent variables are called reflective models. The reflective latent variable is a common latent factor model with reflective indicator; the changes in the underlying latent construct are reflected by changes in the indicators. In addition, the indicators are subject to errors of measurement in the reflective model.



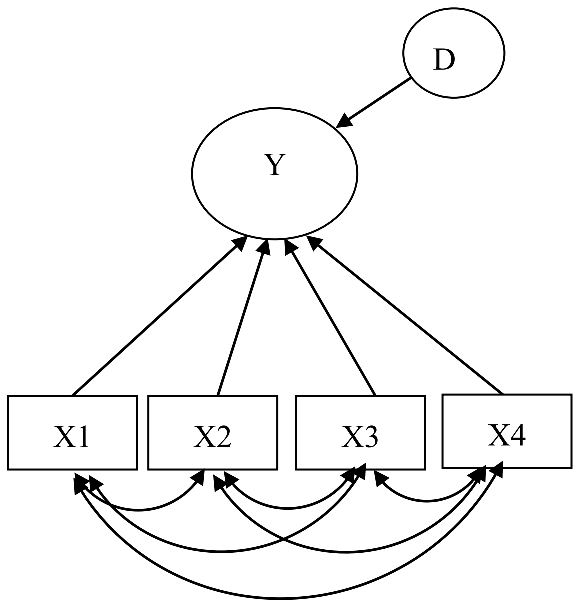
$$y_i = a_{i1}x_1 + e_i$$

y_i = *The* i^{th} *indicator*, a_{i1} = *Coefficient representing effect of latent variable on indicator*, x_1 = *latent variable (or reflective construct)*, e_i = *measurement error for indicator i*

Figure 26: Reflective construct.

For example, a reflective measurement model that is well known to the information systems community is 'perceived ease of use' (PEU) (Davis *et al*., 1989). Davis *et al* defined PEU as 'the degree to which a person believes that using a particular system would be free of effort'. PEU is measured by six reflective indicators: (1) easy to learn, (2) controllable, (3) clear and understandable, (4) flexible, (5) easy to become skilful and (6) easy to use. From this example, an increase in PEU is reflected by an increase in all six indicators. Thus, Jarvis *et al.* suggested that 'all indicators represent the underlying construct in a reflective model are expected to correlate, and that is because of the higher correlations between indicators, the indicators are substitutable and dropping of one indicator should not change the conceptual meaning of the construct' (Jarvis *et al.*, 2003). Chin added that 'Measurement model misspecification occurs when researchers do not pay attention to the directional relationship between the measures and the construct' (Chin, 1998).

The second measurement model is the formative construct; in this type of construct, the indicators influence the construct. These are frequently called 'causal' indicators and the construct is usually termed a composite variable (MacKenzie *et al.*, 2005). This means that the measures cause the construct and that the construct is fully derived by its measurement, and that the measurement error (disturbance) is at the construct level, meaning that part of the construct is not explained by the measures.



$$y = a_1x_1 + \ldots a_nx_n + d$$

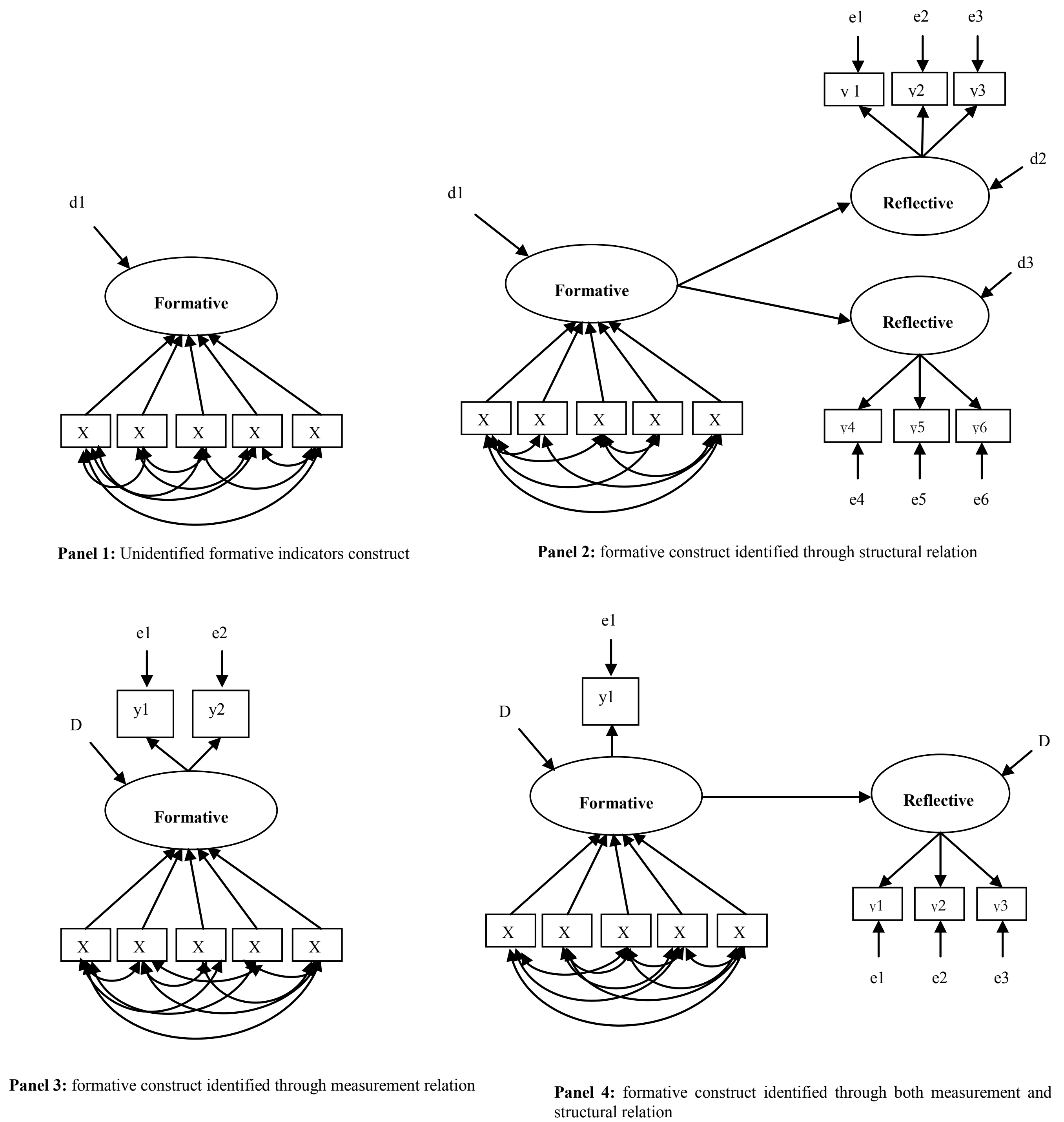
Figure 27: Formative

An example of a formative construct is 'Socio-Economic Status (SES). SES [is] caused by three measures: education, income, and occupational prestige. For example, an increase in income would increase SES even if there were no increases in education or occupational status, thus one would not require an immediate increase in all of the indicators' (Bollen *et al.*, 1991). Because of the direction of causality in formative models, a high correlation between indicators is not expected. However, dropping an indicator would be similar to dropping a part of the construct and should not be done once an indicator is been verified as part of the construct (Bollen *et al.*, 1991). Many researchers have developed guidelines to assist in the development and evaluation of reflective and formative constructs (Jarvis *et al.*, 2003; MacKenzie *et al.*, 2005; Petter, 2007).

Table 11: Guidelines to assess identifying reflective and formative constructs

General rules in identifying reflective and formative constructs			
Concept	**Reflective model**	**Formative model**	**Literature**
Causal Priority	Indicators are realized from construct to indicators	Indicators are explanatory from indicators to construct	Jarvis et al. 2003; MacKenzie et al. 2005; Hair et at 2010; Petter 2007
Measurement Error	Established practices important at the item level	Statistical assessment is problematic, but should be done at the construct level	
Reliability	Indicators should possess internal consistency	Internal consistency is not implied	
Correlations	Should be higher	Not expected	
Identification	"Rule of three"	Two emitting paths plus formative indicators	
Error terms	Yes, at indicator level	No – only disturbances at construct level	
Measurement Inter-changeability	Removal of an item does not change the essential nature of the underlying construct	Omitting an indicator is omitting a part of the construct	

A simple exercise was discussed by Chin (1998), where the researcher asked the question: 'Is it necessarily true that if one of the items were to change in a particular direction (+ or –), the other directions will change follow this change?' If one answers 'no' to this question, the construct is formative. For identification in reflective latent constructs, Bollen (1991) suggested a three-measure rule, meaning that a single factor measurement model should have at least three indicators. The author refers to this as the 'rule of three' when assessing constructs identified by three reflective measures to allow covariances among the measures to be used to estimate factor loading. In this case, the reflective construct can be considered identified by its own indicators. Conversely, a necessary condition for identification of a formative construct is to produce more than one structural relationship (Maccallum *et al.*, 1993).



Panel 1: Unidentified formative indicators construct

Panel 2: formative construct identified through structural relation

Panel 3: formative construct identified through measurement relation

Panel 4: formative construct identified through both measurement and structural relation

Figure 28: Formative Construct Identification – Jarvis *et al.* (2003, p 214).

Jarvis *et al.* (2003) provided three alternatives to achieving identification in formative measurement models. The first method, shown in Figure (28) Panel 2, identifies the formative construct in the structural relation through direct paths to two unrelated reflective constructs. The second method, shown in Figure (28) Panel 3, involves two paths directed from the formative construct to two reflective indicators. In this identification, the formative construct is not dependent upon the structural model; thus, this construct can be either an exogenous or endogenous construct and can go anywhere in the model. This is also known as a multiple indicators multiple causes model (MIMIC) (Diamantopoulos *et al.*, 2001; Lomax *et al.*, 2004). The third method, shown in Figure (28) Panel 4, identifies the formative construct through its positioning in the structural model, where one path is directed from the formative construct to a reflective indicator and one path to an exogenous reflective construct. By specifying a formative construct with the method in Figure (28) Panel 3, future researchers are not bound by any constraints on how that construct is used in their theoretical model.

Jarvis *et al.* (2003) reported that 29% of studies published in the top four journals during a 24-year period improperly specified formative and reflective constructs. Petter *et al.* (2007) looked at 307 journals in management information systems research, most of which were top-ranking journals, and found significant misidentification errors for the constructs used in these studies: 57% were formative when they should have been reflective, and 32% were reflective where they should have been formative. Such measurement model misspecification can create measurement error, which in turn affects the structural model (Jarvis *et al.*, 2003; MacKenzie *et al.*, 2005). In modifying covariance-based SEM to prevent problems with identification, Jarvis *et al.* (2003) and MacKenzie *et al.* (2005) suggested the following steps:

(I) Constrain one or more structural paths or construct error terms to zero;

(II) Decompose the formative construct if it only emits a single path to a reflective construct;

(III) Ensure the formative construct has at least two structural paths to reflective constructs;

(IV) Include two reflective measures as part of the formative construct; and

(V) Include one reflective measure as part of the formative construct and one structural path leading to a reflective construct.

In conclusion, even when using measures that have been previously validated and identified, the relationship between the measures and construct in this research will be closely examined to determine whether the construct is reflective, formative or mixed. Typical symptoms of an identification problem include obtaining obviously specious results from the computer program and the computer program not being able to complete its analysis, thus giving incomplete results.

A primary consideration in combating identification problems is that one must have more equations than unknowns in the analysis (Hair *et al*., 2010). Unfortunately, as the complexity of structural equation models has risen, there is no guaranteed approach for ensuring that these more complex models are identified and that they produce consistent results. The identification problem can be tested by re-estimating the model in multiple runs, each time with different starting values. Results that converge at approximately the same point each time provide evidence of a lack of identification problems in the data.

3.37 Instrument development methodology and construct measurements

This section focuses on instrument development and constructs measurements as adopted in this study. To establish reliable and valid measurement, the research must follow careful steps and assessments to be unambiguous and avoid any complexity during the process of selecting the right measurements. Thus, a collective approach toward constructing measurements has to be organised and clearly illustrated. As Richard noted, 'Although different opinion on the measurement procedures [are evident], one view seems to be shared by most social scientists in that result based on a measure should be repeatable and the measure itself is standardised', and while we 'measure perceptions that by their nature are subjective, a standardised measure enhances social science objectivity' (Richard *et al.,* 2003). In the MIS research process, instrument validation should be conducted before other core empirical validity testing. Cook and Campbell (1979) highlighted the important of instrument validation, whereas Straub *et al.* (2004) noted that the scientific basis of the MIS field is at risk without solid validation of its measurement instruments. Furthermore, Straub (1989) stated that research utilising confirmatory research method, as is the case in this study, first needs to demonstrate that the developed instrument is measuring what it is supposed to measure (Straub, 1989).

The field of MIS has been criticised for its lack of formal and consistent development (Keen, 1980; Straub *et al*., 2004). This is because it is a relatively new and rapidly changing discipline (Straub, 1989; Boudreau *et al*., 2001; Benbasat & Zmud, 2003; Bruce *et al*., 2005). DeLone and McLean (1992) reported that rigor has been problematic in MIS research, particularly with regard to measurement. To avoid such problems and improve validity, a general IDM framework with nested development process models has been adopted in this research based on prior MIS research analysis, as shown in Table (16).

3.38 General perspectives of measurement

Measurement can be defined as the fundamental activity of science; through it, researchers acquire knowledge about objects, events and processes (DeVellis, 2003). However, each area of science develops its own set of measurement procedures; in the social sciences, the measurement procedure generally uses concepts and constructs for which there are no direct measurements available and the variables of interest are part of a broader theoretical framework (DeVellis, 2003).

3.39 The role of measurement in social science

One view of the role of social science measurement that is commonly agreed upon by social researchers is that the result based on a measurement should be repeatable and the measure itself standardised (Richard, 2003). This suggests that researchers could replicate the measure of a social construct in more than one study, increasing the results' reliability and validity. Although this research measures the perceptions of the SISP phenomenon in developing countries, which are by its very nature is subjective; therefore, standardised measurement enhances the objectivity of this study. When measuring a construct, independent testing by a researcher via confirmation of the validity and reliability of that construct will enhance the objectivity of the research; if a disparity found as to the suitability of the measures used in obtaining the findings, objectivity is compromised (Richard, 2003). In this study, the researcher tests SISP within contingency theory of information systems in developing countries; however, the theory can be effectively tested only to the extent that the constructs are effectively measured. Bryman (2008) has identified the following three roles of measurement in social science:

(I) Measurement allows us to delineate fine differences between people in terms of the characteristic in question.

(II) Measurement gives us a consistent device or yardstick to make such distinctions.

(III) Measurement provides the basis for more precise estimates of the degree of the relationship between concepts.

3.40 Avoiding the cost of poor measurement

Poor measurement inflicts limitations on the validity of the conclusions one may reach. Applying a measure that does not assesses the real value and nature of the construct under investigation can lead to more complex consequences when it comes to making a decision and drawing conclusions. Thus, even if a poor measurement is the only one available, the costs of using it may be greater than any benefits attained (DeVellis, 2003). Assessment must be made as to whether the construct can be measured at all (Richard, 2003). As DeVellis states, 'An appropriate strategy might be to get the measurement part of the investigation correct from the very beginning so that it can be taken more or less for granted thereafter' (DeVellis, 2003).

In order to avoid problems associated with poor measurement, this research strives to find adequate measures from the best instruments available; however, this does not mean that the researcher should economise in the construct measurement effort; rather, the research strives for an isomorphism between the theoretical constructs and the procedures of instrument development used in the operationalisation of the construct measurement.

3.41 The historic problem of constructing measurement within SISP research

It is well known to the researchers in the field of MIS that the constructs of SISP have not been well defined and measured (Ives & Olson, 1984; Ginzberg & Schultz, 1987; Sethi & King, 1991; Grover & Lederer, 2004). In social science, and particularly in management science, this is a major problem that has to be highlighted and more efforts need to be made to consolidate the measurement of the constructs. Sethi and King (1991) advised that construct measurement in management science is not an easy process. Venkatraman and Grant (1986) put forward an argument that whilst there is 'an impressive body of psychometric and other streams of measurement literature, […] they are often not directly applicable to strategy measures'. They have also suggested that 'in most cases the linkage between theoretical constructs and their measures is left unspecified or else described in loose unverifiable ways' (Venkatraman & Grant, 1986). In the present research, due to the awareness of this problem, a clear and reliable construct measurement is sought; therefore, the author will seek a solid measurement and develop a valid instrument that contains items which reflect the construct subject to measurement to ensure better results.

3.42 Validity and reliability issues

In many ways, the most important criterion of good research is its validity, as this represents the integrity of the conclusions of such a research study (Bryman, 2008). As DeVellis commented, 'Whereas reliability concerns how much a variable influences a set of items, validity concerns whether the variable is the underlying cause of items co-variation' (DeVellis, 2003). Although validity is usually discussed as distinct from reliability, an alternate view is that reliability is subsumed within the overall concept of validity, in the sense that it represents the internal consistency of measurement items (Bagozzi, 1980). Table (12) illustrates the most important issues of validity and reliability related to the research study.

Table 12: Updated summary of key components of construct validity originally adopter from (Venkatraman & Grant, 1986).			
Component	**"Working" definition**	**Relevant techniques/ Analytical framework**	**References**
Content validity	Extent to which empirical measurement reflects a specific domain of content	Review by experts" and analyses of the extent of consistency among them.	(Richard, 2003) (DeVellis, 2003) (Alan Bryman 2008)
Face validity	Face validity is concerned with how a measure or procedure appears and the good translation of the construct.	Layman judgement of test validity	(Anastasi 1954) (Richard, 2003) (Alan Bryman 2008)
Internal consistency			
1. *Unidimensionality*	Extent to which the items reflect one underlying construct	Exploratory factory analysis; Confirmatory factor analysis.	Nunnally (1978) (Richard, 2003)
2. *Reliability*	Absences of measurement error in cluster score.	Cronbach alpha; Reliability coefficient of structural equation models.	Cronbach (1951) Nunnally (1978) (Richard, 2003)
Convergent validity	Degree to which multiple attempts to measure the same concept with different methods is in agreement.	Correlation analysis; MTMM matrix; Structural equation method — confirmatory factory analysis.	(Alan Bryman 2008) (Richard, 2003)
Discriminate validity	Extent to which a concept differs from other concepts.	Correlation analysis; MTMM matrix; Structural equation methodology.	Campbell &Fiske (1959) (Richard, 2003)
Nomological (predictive) validity	Degree to which predictions from a theoretical network are confirmed.	Correlations; Regressions; Causal modelling.	(Richard, 2003)

However, reliability is concerned with the question of whether the result of a study is repeatable and whether the measurement used is stable and consistent (Bryman, 2008). According to Richard (2003), there are three types of reliability: (a) test-retest reliability, (b) alternative-form reliability and (c) internal consistency reliability. The most common is the internal consistency reliability test, and the most common measure for internal consistency is the Cronbach's alpha coefficient, which concerns the degree of interrelatedness among a set of items designed to measure a single construct (Cronbach, 1951; Richard, 2003; Bryman, 2008). Cronbach's alpha can only be used where items use multi-point scales. The other two tests, which are not often used, assess the temporal stability of construct measures and alternative-form reliability, which is based on correlation rather than covariance, to provide an index of consistency across different constructs (Richard, 2003). In the process of selecting of measurement scales in this research, the author will strive to choose the most reliable measures available for each construct.

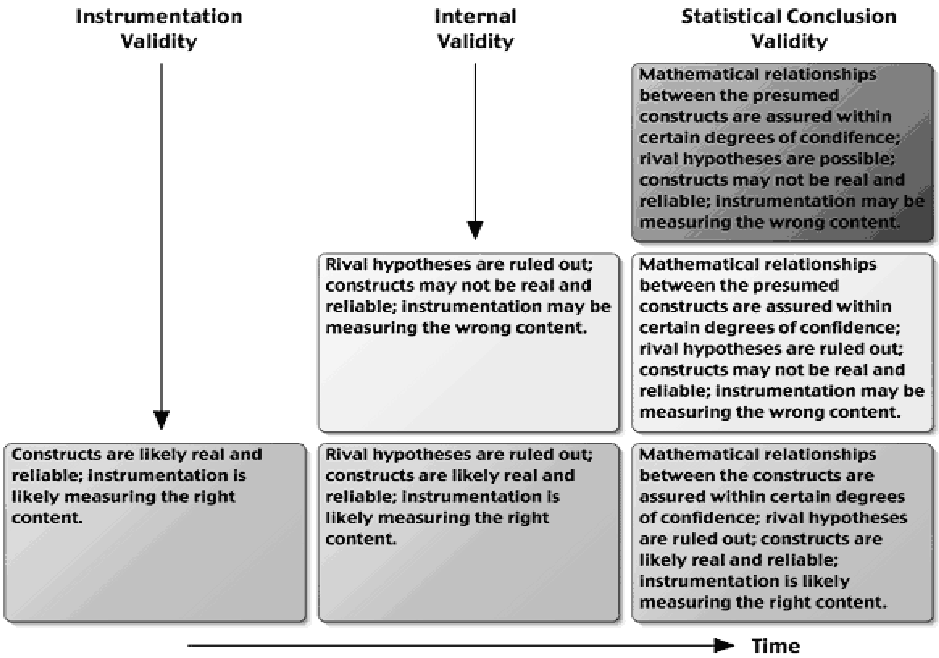


Figure 29: Validation decision tree (Based on Straub, Boudreau, and Gefen, 2004 & Straub, 1989; AIS, 2010). [The bottom line is preferred path; Middle is cautionary; the above one is least desirable]

It is important to stress the issue of measurement development validity and methodology, as the author believes that once a clear methodology has been developed, solid steps toward yielding better findings can be pursued with confidence. In the next discussion, the author looks at different alternatives for an instrument development methodology and decides on the most suitable for this research.

3.43 Instrument development methodology (IDM)

The criteria used to develop instrument methodology in this research are derived from two main assessments. The first assessment is conducted by reviewing a wide range of existing guidelines, construct development methodologies and business scale development literature (DeVellis, 2003; Richard, 2003; Bryman, 2008). The main guidelines used to evaluate this process have been published in well-established MIS-related journals. The methodology presented in this research is more refined than that of Churchill's concept for instrument development (Churchill, 1979), which has been adopted as a research guide in several MIS studies (i.e. Sethi & King, 1994; Smith *et al.*, 1996; Templeton *et al.*, 2002). Many MIS and other research disciplines have used individual components of IDM, as seen in Table (13); however, studies that deployed IDM as proposed in this study have been published in top MIS journals, as represented in Table (14).

Table 13: Studies that deployed instrument development methodology.										
Article	Construct	Definition & dimensions	Items	Pre-test	Pilot test	Item screening	EFA	Alpha	CFA	Related variable
Sethi & King (1994), Mgt Sci	CAPITA	Literature review	Lit review		YES	Correlation	YES	YES	1st and 2nd	
Smith et al. (1996), MISQ	Info privacy	Literature review	Lit review	YES	YES	Experts	YES	YES	1st and 2nd	Regression
Segars & Grover (1998), MISQ	SISP	Literature review	Q-Sort	YES					1st and 2nd	
Byrd & Turner (2000), JMIS	ITI flexibility	Literature review	Lit content analysis	YES	YES				1st and 2nd	SEM
Templeton et al. (2002), JMIS	Org learning	Lit content analysis	Lit content analysis	YES	YES	Lawshe procedure	YES	YES		
McKnight et al. (2002), ISR	e-commerce trust		Existing scale	YES	YES		YES	YES	1st and 2nd	
McKinney et al. (2002), MISQ	Web cust sat		Existing scale	YES	YES		YES	YES	1st and 2nd	
Lewis & Byrd (2003), EJIS	ITI	Lit content analysis	Lit content analysis	YES	YES		YES	YES	1st and 2nd	SEM

The second assessment was deployed against established IDM standards in the field of MIS research. In their article about assessment survey research on production and operations management (POM), Malhotra and Grover (1998) mentioned that there are many benefits in complying with POM standards; Grover and Segars (1998) later adopted the same standards in measuring SISP success. Malhotra and Grover (1998) commented that 'Careful adherence to standards can improve the chances for replication, enhance the cumulative tradition of theory development, the increase respectability of the field, and enhance confidence in its prescriptions to the profession'. Furthermore, they stated that non-compliance to standards 'can and will lead to erroneous conclusions and regression rather than progress in contribution to theory' (p. 415).

Table 14: Top journal using instrument development methodology.		
Author	Journal, Year	Construct
Byrd & Turner	JMIS, 2000	Flexibility of Info Tech infrastructure
Byrd & Turner	Decision Sciences, 2001	Value of the skills of IT personnel
Lewis et al.	JMIS, 1995	Information resource management
Lewis & Byrd	EJIS, 2003	Information technology infrastructure
Templeton et al.	JMIS, 2002	Organisational learning
Lederer & Newkirka a	I&M,2006	Strategic Information Systems Planning
Henry et al	EJIS,2008	Strategic Information Systems Planning
Bechor et al	I&M, 2009	Strategic Information Systems Planning

In the table 15 below, there is a summary of 18 instrumentation quality criteria provided by four IDM standards in the field of MIS and SISP literature. First, Straub (1989) prescribed a set of four standards which researchers should use when employing survey methods. These are:

(I) Pre-testing and pilot testing;

(II) Testing for reliability and factorial validity;

(III) Reusing pre-existing instruments; and

(IV) Employing technical validation.

Second, Malhotra and Grover (1998) proposed a set of 17 attributes for assessing survey instrument quality. These are:

- Reuse of pre-existing instruments;
- Content validity is assessed;
- The unit of analysis clearly defined for the study;
- The instrumentation consistently reflects the unit of analysis;
- Pre-testing;
- Pilot testing;
- The sample frame is defined and justified;
- The respondent(s) chosen are appropriate for the research question;
- Random sampling is used from the sampling frame;
- The response rate is over 20%;
- Non-response bias is estimated;
- Tests are done for reliability;
- Triangulation is used to cross-validate results;
- There is sufficient statistical power to reduce statistical conclusion error;
- Factorial validation is employed;
- Constructs have multiple items; and
- Confirmatory methods are used.

Third, Venkatraman and Grant (1986) used highly stringent filtering rules to identify mature survey instruments: (I) the scale uses multiple, higher level items (discriminatory power and low measurement error); (II) the scales are internally consistent (unidimensionality and reliability); and (III) the scales are constructed and validated (face, content, convergent, discriminate and nomological). Finally, Zmud and Boynton (1991) considered an instrument to be 'technically acceptable' if it had the following four characteristics: (I) Constructs have multiple items; (II) the psychometric properties (i.e. reliability and validity) are tested; (III) it appears in a refereed journal; and (IV) it could be reconstructed.

Table 15: Instrument quality standard.

Instrument quality standard	Straub (1989)	Malhotra & Grover (1998)	Venkatraman & Grant (1986)	Zmud & Boynton (1991)	Where addressed in This study IDM
Reuse of pre-existing instruments	☑	☑			Stage I: Construct Development Content analysis
The unit of analysis clearly defined for the study		☑			
Instrumentation consistently reflects the unit of analysis		☑			
Content validity is assessed		☑	☑		Stage II: Draft instrument Pre-test Pilot test Item screening
Pre-testing	☑	☑			
Pilot testing	☑	☑			
The sample frame is defined and justified		☑			Stage III: Measurement properties Exploratory assessment Exploratory factor analysis Reliability analysis Confirmatory assessment Confirmatory factor analysis Higher order factor analysis Related variable analysis
Respondent(s) chosen are appropriate for the research question		☑			
Random sampling is used from the sample frame		☑			
The response rate is over 20%		☑			
Non-response bias is estimated		☑			
Tests done for reliability	☑	☑	☑	☑	
Triangulation is used to cross-validate results		☑			
There is sufficient statistical power to reduce statistical conclusion error		☑			
Factorial validation is employed	☑	☑	☑	☑	
Constructs have multiple items		☑	☑	☑	
Confirmatory methods are used		☑			
The instrument appears in refereed journal(s)				☑	

The two assessments of IDM provide evidence that improvement in the instrument's validity leads to better research quality. From the above assessment, this research adopts the traditionally used techniques that address each standard with more comprehensive validity tests; these arranged as structured approaches in three stages to allow better quality research in each stage and consolidate what has been usually adopted in most MIS instrument development methodologies. Table (16) represents the IDM stages adapted in this study.

Table 16 : IDM adapted stages in this study.

Methodology	Content validity	Factorial validity	Reliability	Convergent validity	Discriminant validity	Nomological validity
Stage I: Construct Development						
Content analysis	☑					
Stage II: Instrument Validity& Pilot Study						
Pre-test	☑					
Pilot test	☑					
Item screening	☑					
Stage III: Statistical measurement						
Exploratory assessment						
Exploratory Factor Analysis		☑		☑	☑	
Reliability Analysis			☑			
Confirmatory Assessment						
Confirmatory Factor Analysis		☑	☑	☑	☑	
Higher order Factor Analysis		☑				
Related Variable Analysis						☑

3.44 Stage I: Construct development

3.44.1 Content analysis

Content analysis is a common technique adopted in the social sciences to draw suggestions from relevant secondary data sources (i.e. literature, interview transcripts and case studies); it is an appropriate method to address the research domain, concept and developing constructs scales where the unit of analysis is clearly defined for the study (Malhotra & Grover, 1998). When using other sources, reasonable standards and referencing must be specified to ensure that the perspectives assessed are appropriate to the construct under consideration (Bruce *et al.*, 2005). A content analysis of selected material will typically involve multiple repetitions where the basis of the construct is established first, followed by the conceptual definition and then the dimensions of the construct. Establishing the construct dimensions will require the most effort, but if the construct has been previously measured, it is possible to reuse pre-existing measurement in current research (Straub, 1989; Malhotra & Grover, 1998). When selecting dimensions for construct measurement, it has been suggested that multiple item scales should be used to the greatest extent possible for each dimension of the construct (Bruce *et al.*, 2005). The items then provide the basis for initial instrument that consistently reflects the unit of analysis (Malhotra & Grover, 1998). The instrument should then be refined in the next stage.

3.44.2 Stage II: Instrument validity

After selecting the scales for each construct according to the research theory and the nature of the investigation, and after the initial instrument is developed, the following steps need to be carried out to purify and validate the instrument and produce the final research instrument.

3.44.3 Pre-test

Pre-testing is a first step to obtain empirical feedback from a highly controlled sample to assess the suitability of the initial instrument. The participants in the pre-test should be selected on the bases of their expertise and knowledge of the units under investigation. The researcher then asks participants to complete the instrument first and give their feedback on the initial instrument design (including format, content, proofreading if translated, understandability, terminology and ease and speed of completion); participants should also be asked to identify how relevant the items are in measuring the construct, and give their feedback for enhancements. The result from the pre-test should be reviewed and adjustments made to the instrument as appropriate (Malhotra & Grover, 1998; Straub, 1989).

3.44.4 Pilot test

Follow the review of the pre-test, a pilot test should be undertaken to further appraise and purify the instrument. A pilot, or feasibility study, is a small experiment designed to test logistics and gather information prior to a larger study in order to improve the quality and efficiency of the instrument. Participants chosen for the pilot test should be selected based on the pre-defined analysis, and be similar to the population that will be the target of the administrations of the final instrument. Pilot test participants should be asked to fill out the survey and then comment on difficulties in completing the instrument and offer suggestions for improvement, including specifying any additional item statements they felt were missing or items that should be deleted. The results from the pilot test should be reviewed and adjustments made to the instrument as appropriate (Malhotra & Grover, 1998; Straub, 1989, Dillman, 2009).

3.44.5 Item screening

Item screening is the third step in refining the instrument; the rationale of this step is to empirically screen the items employing the quantitative procedure developed by Lawshe (1975), which determines whether each item on the instrument satisfactorily represents the content domain of the construct. The item screening process begins with selecting a panel of experts knowledgeable about the concept under investigation. The panellists are sent a list of the items from the updated instrument and are asked to evaluate the relevance of each to the construct on a three-point scale:

1= Not Relevant, 2= Important (But Not Essential), 3= Essential.

From the collected data, a content validity ratio (CVR) is calculated for each item according to the following formula:

$$CVR = (n - \frac{N}{2})/(\frac{N}{2})$$

Where N is the total number of respondents and n is the frequency add up of the number of panellists rating the item as appropriate, either 3= Essential OR 3= Essential and 2= Important (But Not Essential). After CVR is calculated, each item should be evaluated for statistical significance, using the table published in Lawshe (1975).

Table 17: Minimum values of content validity ratio Lawshe (1975).

Minimum Values of CVR and CVR_t One Tailed Test, p= .05	
No. of Panellists	Min Value
5	0.99
6	0.99
7	0.99
8	0.75
9	0.78
10	0.62
11	0.59
12	0.56
13	0.54
14	0.51
15	0.49
20	0.42
25	0.37
30	0.33
35	0.31
40	0.29

Statistical significance implies some level of content validity for the item, whereas statistical non-significance indicates an unacceptable level of content validity. Items that are not statistically significant based on CVR should be dropped from the instrument (Lawshe, 1975, p. 6). Item screening should be the last stage before data collection starts and the final, refined instrument is distributed.

3.44.6 Sampling in multiple mediation effect

There is no fixed rule regarding sample size in SEM; the requisite sample size depends on a variety of aspects such as the study design (e.g., cross-sectional vs. longitudinal), the relationship between the indicators, the reliability of the indicators, size of the model, the amount and patterns of missing data, scaling (e.g., categorical, continuous) and estimator type. Hair *et al.* (2009) stated that 50 responses has been used to provide valid results using the maximum likelihood estimating method; they recommend that the sample size should be between 100 and 200 respondents (Klein, 2005; Timothy, 2006, Hair *et al.,* 2009). However, there are recommendations about sample size in SEM; some suggested that the ratio of the number of cases to the number of free parameters should be between 10:1 and 20:1; thus, a path modelwith 20 parameters should have a minimum sample size of 200 cases (Kline, 2005). According to Klenke (1992), the sample size in MIS research is 'frequently' too small for the number of scales used to measure a construct. On the other hand, Fritz *et al.* (2007) and Hair *et al.* (2009) suggested that if there is concern about specification error, the sample size should be increased. Therefore, the more complex the modelis, the larger the sample required.

In their large literature analysis research regarding the sampling in mediation effect, Fritz *et al.*'s (2007) aim was to present sample sizes necessary for 0.8 powers for the most common and the most recommended tests of mediation. They found six common tests regard sample size in mediation effect: Baron and Kenny's causal-steps test, the joint significance test, the Sobel first-order test, the Prodclin test, percentile bootstrap and bias-corrected bootstrap. On the bases of their literature review and the results of the empirical power simulations they carried out, the researchers recommended the bias-corrected bootstrap test in a mediation effect model(Fritz *et al*,. 2007).

Table 18: Results of the literature survey: frequency of sample sizes for mediation effect, Fritz et al., (2007).

Sample size	Frequency	Percentage of studies
20–50	11	5.82
51-100	31	16.40
101-150	34	17.99
151-200	25	13.23
201-250	14	7.41
251-300	15	7.94
301-350	11	5.82
351-400	10	5.29
401-500	3	1.59
501-600	10	5.29
601-750	2	1.06
751-1000	5	2.65
1001-1250	8	4.23
1251-1500	1	0.53
>1500	9	4.76

Questionnaires commonly have low response rates; therefore a proper design, survey protocol and administration should be carefully considered (Dillman *et al.*, 2009). It is important to estimate the possible response rate percentage that can be achieved from administering the final survey; the initial pilot study in this research achieved a 60% response rate, but this may change in the final survey. Therefore, a realistic target is between 30 and 50%, since Denscomb (2003), for example, suggested that a 20% response rate is good for research confidence. The above discussion demonstrates that while there are guidelines available in the literature, there seems to be no consensus on an adequate sample size. However, there is a strong rule of thumb, for example, it has been suggested that the sample size should be more than 100 cases or at least 5:1 for structural paths directed at a particular construct in the structural model(Hair *et al.,* 2010). In the case of this research model, this means that there should be 115 respondents.

Such covariance-based SEM tools as AMOS 17 use a maximum likelihood function to obtain parameter estimates, and make greater demands on the scales, assumptions and sample. In addition, statistical significance can be assessed with AMOS 17 using a bootstrap re-sampling procedure. The current study applied such a procedure with 2,000 re-samples, as well as using the AMOS 17 default (ML). With an expected response rate of between 30 and 50%, the number of questionnaires to be administered to a random sample drawn from the sample frame based on the pre-established unit of analysis to achieve the requisite sample size (120-200 completed cases) would be between 386 and 400 with 386 as the minimum. Missing data will be dealt with using data imputation analysis in AMOS 17. Data will be collected through multiple administrations of the instrument and the measurement.

Once all responses have been received, four aspects of response quality should be evaluated. First, the response rate should be computed and should be at least 20% (Malhotra & Grover, 1998). Second, statistical power should be examined by calculating the subject-to-item ratio, which should be at least 5:1 (Hair *et al.,* 2010). Third, non-response bias in the returned sample should be assessed to ensure that the sample data adequately reflect the population. This can be accomplished by testing important strategic characteristics using either a one-sample x^2 test (Byrd & Turner, 2000), or where appropriate, a one-sample t-test (Rainer & Harrison, 1993). Fourth, common method variance (i.e., variance attributable to the measurement method rather than the constructs represented by the measures) is a survey research problem wherein individual subjects rate two or more constructs and are suspected of giving socially acceptable answers, although the CIO is typically viewed as the most knowledgeable person in the organisation to assess SISP (Premkumar & King, 1992), and most researchers thus use a single subject to assess it (Raghunathan & Raghunathan, 1991; Lederer & Sethi, 1996; Segars *et al.*, 1998; Sabherwal, 1999; Kunnathur & Shi, 2001; Lee & Pai, 2003; Lin, 2006; Henry *et al.*, 2008). The current study employed Harman's single-factor test to check for common method variance (Schriesheim, 1979; Podsakoff & Organ, 1986). The test assumes that if a substantial amount of such variance exists in the data, a single factor will emerge from an exploratory factor analysis of all the variables and will account for most of the variance.

3.45 Stage III: Evaluation of measurement properties

After the data are collected, the assessment method follows a strategy of triangulation; the exploratory and confirmatory assessment techniques are sequentially applied in order to achieve the best results of construct validation (Schumacker & Lomax, 2004; Byrne, 2010).

3.45.1 Exploratory factor analysis (EFA)

Exploratory factor analysis should be used to empirically obtain the initial set of factors for the construct (Byrne, 2010). In order to verify that the data are agreeable to factor analysis, two tests should first be executed (Bruce *et al.,* 2005): KMO and Bartlett's test of sphericity. If positive findings from these two tests (KMO 0.6 or above and Bartlett's test of sphericity sig value of 0.05 or smaller), the factor analysis may proceed. The number of factors obtained from the factor analysis procedure should be based on the criterion that the eigenvalues of the selected factors are one or greater (Nunnally, 1978). A screen plot is also used to further verify the number of factors to be included in the solution. In MIS research, several rotation techniques have been suggested to reach the 'best' factor solution. Rotation solutions should be judged on simplicity, interpretability and the per cent of variance explained by the set of designated factors (Bruce *et al.*, 2005). Using the results of the selected rotation method, an appropriate factor-loading threshold must be established. The factor loading for each item is a measure of consistency between items in a factor. An item should be assigned to a factor if the item's loading exceeds the established threshold.

There are three considerations associated with threshold selection. The first is to maximise the loading threshold. A high threshold ensures greater within-factor correlation, which improves reliability. Second, the threshold should be set in order to include as many items as possible, because unassigned items explain a certain percentage of the systematic covariance among all items and the objective is to minimise this amount. Third, the threshold should minimise item loading on multiple factors. Thresholds for exploratory factor analysis used in other MIS construct development studies include 0.50 (Straub, 1989), 0.45 (Lewis *et al.,* 1995) and 0.35 (Lederer & Sethi, 1992). Items that have loadings less than the threshold should be dropped from further analysis and from the instrument in future administrations; in addition, items loading on multiple factors should also be dropped (Bruce *et al.*, 2005). However, careful judgement should be applied, so that an item with strongly justified theoretical relevance is not lost at this point. Once each item has been assigned to only one factor, labels for the factors should be created to represent the meaning of the factor based on the items that load on that factor. It is considered wise to use fewer items per construct as sample size and complexity are some of the major factors that affect the validity of the results (Hair *et al.*, 2010). Reducing the number of items simplifies the model. The use of composite item parcelling is recommended in the literature as a way of reducing the number of indicator variables (Schumacher & Lomax, 2004; Hau & Marsh, 2004). Item parcelling involves forming composite items from a number of items, thereby reducing the number of items while still accounting for all. These factors, and their items, represent an empirically derived operational definition for the construct of interest.

3.45.2 Reliability analysis

Reliability analysis is concerned with the internal consistency of a measurement instrument. In this study, three main reliability tests were to be conducted: Cronbach's alpha reliability, composite reliability and the average variance extracted.

Cronbach's alpha reliability: Cronbach's alpha is the most common form of internal consistency reliability coefficient; alpha is computed for each of the construct components (factors) determined from the factor analysis, using the same data (Cronbach, 1971). Alpha equals zero when the true score is not measured at all. Alpha equals 1.0 when all items measure only the true score. Cronbach's alpha values of > 0.70 have been considered to represent an acceptable measurement model for each construct (Pallant, 2001). If a factor does not exhibit acceptable reliability, the alpha statistic may be increased by dropping items from the factor based on the magnitude of the item loadings. Items with the smallest loadings should be dropped and the effect on the alpha statistic of each factor observed. The process is stopped when an acceptable alpha is achieved (Bruce, 2005).

Composite reliability: Also called reliability rho or Raykov's reliability rho (ϱ) test, composite reliability is employed if it may be assumed that a single common factor underlies a set of variables. Raykov (1998) has demonstrated that Cronbach's alpha may over- or underestimate scale reliability. For this reason, composite reliability is preferred and may lead to higher estimates of true reliability. The acceptable value of composite reliability would be the same as the researcher sets for Cronbach's alpha, since both are attempts to measure true reliability. Graham (2006) discussed AMOS computation of composite reliability; in this research, the values of composite reliability are negative if it is below 0.7 (as suggested by Hair, *et al.*, 2010).

The average variance extracted (AVE): An alternative factor-based procedure for assessing discriminate validity is that proposed by Fornell and Larcker (1981). In this method, the researcher concludes that constructs are different if the average variance extracted (AVE) for the constructs is greater than their shared variance. That is, the square root of the AVE for a given construct should be greater than the absolute value of the standardised correlation of the given construct with any other construct in the analysis. Fornell and Larcker (1981) considered a construct to display convergent validity if the AVE is at least 0.5. During the exploratory analysis process, the instrument is improved by removing items. This could be justified in the factor analysis step due to loadings below the established threshold or because an item loads on multiple factors. Likewise, items may be dropped to improve the reliability statistics. After the EFA is conducted and constructs are defined with their item loading, these items should be cast into an updated edition of the measurement instrument and the new version should be administered to a different random sample. As with the first administration, the data from this second administration should be evaluated for response rate, statistical power and non-response bias. The measurement properties of the instrument will again be evaluated and the instrument will be tuned using the second sample, this time via confirmatory factor analysis.

3.45.3 Confirmatory assessment

The purpose of CFA is to identify latent factors that account for the variation and covariation among a set of indicators using common factor measurement models that usually based on maximum likelihood estimation (Brown, 2006). Confirmatory factor analysis 'provides an appropriate means of assessing the efficacy of measurement among scale items and the consistency of a pre-specified structural equation model with its associated network of theoretical concepts' (Segars & Grover, 1998, p. 148). In utilising the confirmatory factor model, the step-by step process suggested in Hair *et al.* (2010) and Byrne (2010) will be applied. The specification of CFA is strongly driven by theory or prior research evidence. The CFA test is a more parsimonious solution in that it indicates the number of factors, the pattern of factor loadings and cross-loadings, which are usually fixed to zero' and an appropriate error theory 'random or correlated indicator error. In contrast to the EFA, CFA allows for the specification of relationships among the indicator uniqueness's (error variances); hence, every aspect of CFA model is specified in advance. The acceptability of the specified model is evaluated by the model fit index and the interpretability and strength of the resulting parameter estimates. CFA is more appropriate than EFA in later stages of constructing validation and testing construction when prior evidence and theory support the structure of latent variables (Brown, 2006). Confirmatory factor analysis was originally formulated for use with the variance/covariance matrix (Hair *et al.*, 2010). However, it is acceptable to use with the correlation matrix as well (Bruce, 2005).

3.45.4 Construct measurement and path analysis assessment

The assessment of the fit of the measurement model focuses on three issues. These include the unidimensionality, validity and reliability of the measurement of model (Hair *et al.*, 2010). One of the common methods is to use reliability measures such as Cronbach's alpha. However, it should be recognised that this does not include a measurement of unidimensionality, but only assumes that it exits (Hair *et al.*, 2010). The assessment of the structural modelis ideally based on the examination of the statistical significance of the estimated coefficients. In the following discussion, the author will address validity issues should be considered in the measurement of the structural models. First, the author will look at *'unidimensionality',* defined as the existence of one latent construct underlying a set of measures (Anderson *et al.*, 1987). In order to assess unidimensionality, the factors derived from confirmatory factor analysis should first be evaluated individually and then as a collective network. According to Segars and Grover (1998), this procedure 'provides the fullest evidence of measurement efficacy and also reduces the likelihood of confounds in full structural equation modelling which may arise due to excessive error in measurement' (Segars & Grover, 1998).

Unidimensionality in confirmatory factor analysis is usually evaluated with statistical significance of estimated coefficients obtained in a set of measurement indicators. Items should be retained in a factor if their standardised loading exceeds the established threshold; items with a loading below this cut-off should be dropped from further consideration. However, researchers must always be careful when dropping items. First, removing items from factors may cause identification problems (Segars & Grover, 1998). Furthermore, when items are dropped, some of the variation in the measure may be lost. Third, removing items may lessen the effectiveness or value of the construct, since the items are not dropped due to theoretical considerations (Bruce, 2005).

Factorial validity relates to the degree that a factor analysis solution reflects the theoretical dimensions of a construct (Barki & Hartwick, 1994). Straub (1989) observed that the appearance of logical factors in factor analysis is confirmation that the measure under investigation exhibits latent variables. As such, the degree of rationality of these factors in relation to the construct provides evidence to support construct validity. In this methodology, factorial validity is determined by comparing the factors from the factor analyses after EFA with the original dimensions established from the literature review. *Convergent validity* is the extent to which multiple measures of a construct are in agreement with one another. It is assessed at multiple points in the methodology; the first assessment is accomplished via exploratory factor analysis by examining the loadings of each item on the derived factors. While there is 'no generally accepted standard error of factor loadings' (Kerlinger, 1986, p. 572), relatively high factor loadings indicate convergent validity (McKinney *et al.*, 2002). Since items are assigned to factors only when their loadings exceed a specified threshold, the factors by definition exhibit a degree of convergent validity. Convergent validity is verified by examining correlations between the factors calculated in the examination of unidimensionality with CFA. Correlations among the factors (construct components) provide evidence of convergent validity (Bagozzi *et al.*, 1991).

Discriminate validity refers to the clarity of the construct components (Campbell & Fiske, 1959). As with convergent validity, discriminate validity is evaluated with both exploratory and confirmatory factor analysis. In the exploratory model, the lack of cross loadings of an item on the factors is evidence of discriminate validity (McKinney *et al.*, 2002). In the confirmatory model, the correlations among the factors which are statistically < 1 indicate discriminant validity (Smith *et al.*, 1996). *Nomological validity* involves tests of the relationships between the construct and its hypothesised antecedents and consequents. It refers to the ability of a construct's measure to predict measures of other constructs in a network of constructs theory, as would be theoretically anticipated (Cronbach & Meehl, 1955). In order to conduct this analysis, measures for these related variables will need to be included in the administration of the instrument. These measures are then used in the second-order confirmatory model along with the construct under development. Nomological validity is demonstrated if statistically significant paths are observed between the related variables and the construct of interest, as would be expected according to theory. The measurement model provides an assessment of convergent and discriminate validity, and the structural model provides an assessment of nomological validity (Lomax *et al.*, 2004). Rules of thumb in assessing the CFA and SEM are presented in Table (19).

3.45.5 Model fit indices

When estimating the default model fit to data using MLE, one can be assessed using goodness of fit indices. These indices measure the correspondence of the actual input matrix with that predicted from the model. Hair *et al.* (2010) categorised goodness of fit measures into three groups: (i) absolute fit measures which can be used to assess the overall fit (both structural and measurement models), including the likelihood chi square statistic (X^2), goodness of fit index (GFI), root mean-square residual index (RMR) and the root-mean-square error of approximation

(RMSEA); (ii) incremental fit measures comparing the proposed modelwith the null hypothesis modelto determine the degree of improvement over the null model; measures under this category include the Tucker-Lewis index (TLI, also known as the non-normed fit index [NNFI]), the normed fit index (NFI), the comparative fit index (CFI), and the adjusted goodness of fit index (AGFI); (iii) parsimonious fit measures, which provide a comparison between models with different numbers of estimated coefficients with the aim of determining the amount of fit achieved by each estimated coefficient; the measures under this category include normed chi-square (CMIN/DF), the parsimonious goodness of fit index (PGFI) and the parsimonious normed fit index (PNFI).

3.45.6 Reporting goodness of fit in this study

There is no agreed-upon single measure that can be used to judge the fit of a model[3]; AMOS reports 25 different goodness of fit measures, and there is wide disagreement on just which fit indexes to report. For instance, many consider that GFI and AGFI are no longer preferred (David, 2009). The choice of which index is the most important to report is indeed a dispute among methodologists; it is therefore recommended that one or more measures from each group mentioned above be employed to judge the acceptance of model fit (Hair *et al.*, 2010, Schumacher & Lomax, 2004). In this research, the model fit indexes that will be reported are chi-square p value, DF, Chi-square/DF, RMSEA, GFI, NFI and CFI for the measurement models and RMSEA, CFI and Chi-square/DF for the path analysis model; the results from these indexes should be satisfactory when it comes to accepting or rejecting a model (Hair *et al.*, 2010). The indexes have been carefully selected bearing in mind the sample size and the number of the indicators in the models, as these differ in the CFA model and the full path analysis model; rules of thumb for model GOF are presented in Table (19, 20).

3.45.7 Reporting the SEM

Several recommendations have been suggested when reporting on SEM. McCollum and Austin (2000) suggested guidelines in reporting on the SEM that include the following: (1) a clear and complete specification of models and variations; (2) a clear listing of the indicators of each latent variable; (3) a clear statement of the type of data analysed with presentation of the sample correlation or covariance matrix (or making such data available upon request); (4) specification of the software and method of estimation; and (5) the presentation of complete results (multiple

[3] These overall fit tests do not establish that particular paths within the modelare significant. If the modelis accepted, the researcher will then go on to interpret the path coefficients in the model('significant' path coefficients in poor fit models are not meaningful).

measures of fit). It is also recommended to include a path diagram that includes latent factors. Table 19 represents rules of thumb in both CFA and SEM.

Table 19: Summary of the rules of thumb in CFA and SEM based on the work of, Hair *et al.,* (2010).

Statistical Measurement	Estimates	Rules of Thumb "CFA"	Rules of Thumb "SEM"
GOF	Chi-square, Chi-square/DF, degree of freedom, model*P* value, GFI, RMSEA, PCLOSE, PGFI, NFI, CFI, RMR, AGFI, NCP	Chi-square= p> 0.05, Chi-square/DF= value between 2 and 5 is considered acceptable, GFI=≥ 0.90, RMSEA=≤ 0.05 to 0.08, PCLOSE=>50, NFI=≥ 0.90, CFI=≥ 0.90, AGFI=0.90	Chi-square= p> 0.05, Chi-square/DF= value between 2 and 5 is considered acceptable, GFI=≥ 0.90, RMSEA=≤ 0.05 to 0.08, PCLOSE=>50, NFI=≥ 0.90, CFI=≥ 0.90, AGFI=0.90
Other Statistics	Regression Weights, P value, critical ratio (T-value) and estimate, Estimates of covariances, P value, critical ratio (T-value) and estimate, Estimates of correlations, P value, critical ratio (T-value) and estimate, Squared Multiple Correlations (output), Standardized Regression Weights	P value is significant at P≤0.05 critical ratio (T-value) greater than 1.96	P value is significant at P≤0.05
Convergent Validity	Factor loadings	Standardized loadings estimates must be statistically significant and should be 0.5 or higher, and ideally 0.7 or higher.	
	Average Variance extracted (AVE)	AVE should be 0.5 or greater to suggest adequate convergent Validity.	
	Composite reliability	Reliability should be 0.7 or higher to indicate adequate convergence or internal consistency.	
Discriminant Validity	(AVE) and squared inter-construct correlation estimates (SIC)	All construct variance extracted (AVE) estimates should be larger than the corresponding squared inter-construct correlation estimates (SIC). If they are, this means the indicator variables have more in common with the construct they are associated with than they do with the other constructs.	
Nomological Validity	Covariance *P* value and positive correlations estimate	Nomological validity is tested by examining the significance for covariance and positive correlations between the constructs in the measurement model.	

3.46 Tests for normality and outliers

The requirement of multivariate normality can be judged by testing each of the variables for univariate normality. To confirm the normality assumption relative to the data from the instrument items, the value of the mean, the skewness and kurtosis statistics of these variables should be examined (Hair *et al.,* 2010). A rule of thumb exists where data are assumed to be normal if skew and kurtosis are within the range of (+/- 1.5 or even 2.0) (Schumacker & Lomax, 2004, p. 69). Others have suggested that multivariate values of 1.96 or less mean that there is non-significant kurtosis, while values > 1.96 mean there is significant kurtosis, which indicates significant non-normality (David, 2009). The above discussion addresses the component used to develop a methodological model using SEM which the author will follow in order to develop, validate and measure the research instrument and report the findings in compliance with the research enquiry, purpose and design. This methodology was designed with great caution, bearing in mind that the main objective is to eliminate biases which may undermine the meaningfulness of this research study.

Table 20: Summary of the fit index based on the work of Hair *et al* (2010).		
Fit Index	**Description**	**Acceptable fit**
Absolute Fit		
Chi-Square Statistic χ^2 in AMOS P(CMIN)	Tests the statistically significant differences between the observed and estimated matrices. If P(CMIN) is less than .05, we reject null hypothesis that the data are a perfect fit to the model	p> 0.05
Root mean square error of approximation (RMSEA)[4]	This is the square root of the mean of the squared residue. (RMSEA) measures discrepancy in terms of the population and not just the sample	≤ 0.05 to 0.08
Goodness of fit index(GFI)	Goodness of fit	≥ 0.90
Incremental Fit		
Comparative Fit index (CFI)	Compares the estimated model against the null or independence model. It is more appropriate for a model development strategy or when smaller sample is used (Hair et al 1998). Values range from 0-1	≥ 0.90
Incremental Fit Index (IFI)	Incremental Fit Index compares estimated model with null or independent model	≥ 0.90
Normed fit index (NFI)	Provides a relative comparison of the proposed model to the null model. Values range from 0 to 1	≥ 0.90
Non-normed Fit index or the Tucker Lewis index (NNFI/TLI)	This combines a measure of parsimony into a comparative index between the proposed model and the null model. Values range from 0-1	≥ 0.90
Parsimonious Fit		
(CMIN/DF)	Calculated by dividing the Chi-Square Statistic by degrees of freedom (*df*)	≤2 to 5
parsimonious normed fit index (PNFI)	It is a modification of the NFI, and takes into account the number of degrees of freedom which is used to achieve a level of fit. It is useful in comparing competing models.	No recommendation however, differences of 0.06-0.09 proposed as substantive difference

Figure (30) represents the research methodology as constructed from the prior discussions and outlines the research map used in the succeeding chapters.

[4] "Practical experience has made us feel that a value of the RMSEA of about .05 or less would indicate a close fit of the modelin relation to the degrees of freedom. This figure is based on subjective judgment. It cannot be regarded as infallible or correct, but it is more reasonable than the requirement of exact fit with the RMSEA = 0.0. We are also of the opinion that a value of about 0.08 or less for the RMSEA would indicate a reasonable error of approximation and would not want to employ a modelwith a RMSEA greater than 0.1." (Browne and Cudeck, 1993)

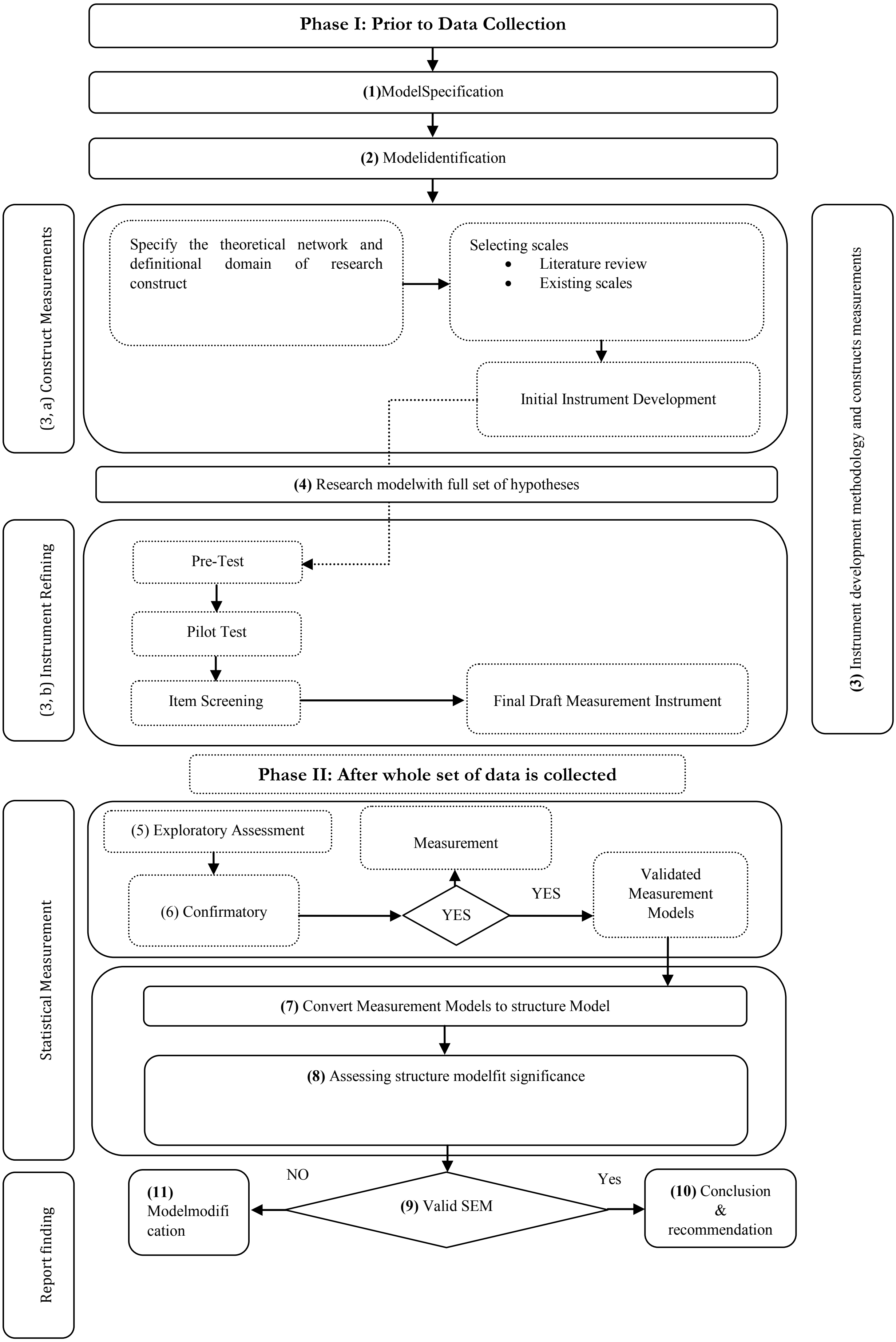


Figure 30: Methodology modelof this research.

3.47 Chapter three summary

The methodology adopted in this research is based on a deductive approach to test the theory, applying a survey-based quantitative approach. The SEM technique used to develop the research instrument and constructs to ultimately tests the hypothesis in path model. The methodological model in this research contains two main phases derived from the initial model drawn at the start of methodology chapter, as well as from the instrument development methodology (IDM) developed from prior MIS instrument validity studies. The first phase contains the methodological components before data collection; it is characterised by its theoretical foundation of IDM. The second phase is characterised by its SEM development methodology; the whole dataset is collected at this stage. The methodological components include the following: (1) model specification, (2) model identification, (3) instrument development methodology (IDM) and construct measurements (a–construct measurement development, b–instrument refining) and (4) generation of a research model with a full set of hypotheses. After the whole dataset is collected, statistical measurement of the instrument must be carried out, including (5) factor assessment (a–exploratory assessment, b–confirmatory assessment), (6) validation of measurement models, (7) conversion of measurement models to SEM, (8) assessment of SEM validity, (9) confirming SEM validity, (10) model modification and (11) conclusion and recommendation. Having discussed the theoretical background of each component included in the methodological model and previously discussed the general methodology, including strategy and design. The main focus of the following discussion will be the practical part of this research. The following chapters will be guided by the components constructed from the methodology model shown in Figure (30).

Chapter Four: Operationalisation of Research Constructs

4 Introduction

This chapter will discuss the operationalisation of research constructs and develop measurable items for each construct. These constructs will be the components of the theory under investigation, namely SISP success, SISP process and SISP context. The measurement items need to be developed in order to statistically investigate the relationship amongst each of these constructs, as defined earlier in the model specification and identification sections; to do so, each one of the constructs will be separately discussed and measurement items will be developed along with full research hypotheses.

4.1 Development of construct measurements

The important of well-defined constructs cannot be overstated, as the validity of what is being measured will rest largely on the definition and content domain. Clearly defined constructs is the first step in the process of developing an instrument. Given that this study has more than one construct, each one will be defined and a scale developed for it separately. A collective approach toward construct identification and development has to be organised and clearly illustrated; Figure (31) shows the process that the researcher adopted to target the constructs to be developed and measured.

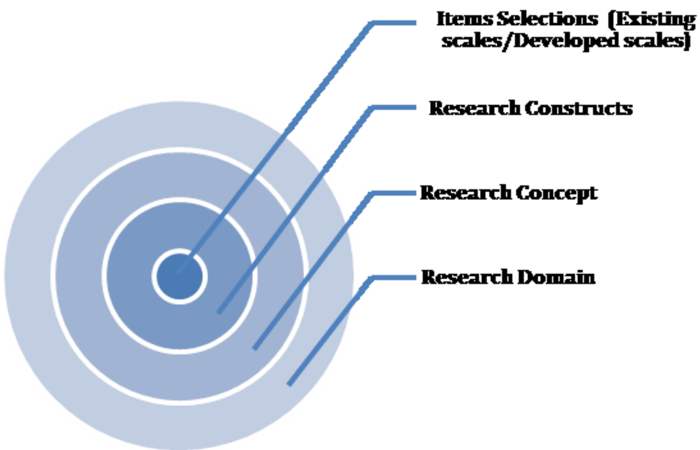


Figure 31: Process of identifying the constructs measurement items.

It is important to mention that the strategic information systems planning (SISP) domain is part of a wider study of management information systems (MIS) study, which itself falls under general management theories; however, the research interest centres on concepts within SISP, particularly in developing countries, and specifically in Libyan organisations as a case study. As mentioned above, this research employs the conceptual framework of the contingency theory in MIS (originally developed within organisation and management theory) into the SISP domain. In the following discussion, the author will address each construct separately to develop the contents of measurement that later will be used in the research instrument. Although the theory suggested a flow of the relationship between these three constructs in the order of 'context, process, success', the construct the development procedure will follow the order of 'success, process, context' because once the measurement is developed for the dependent construct 'SISP success', it can be related to the other two constructs to reflect the dependent construct more adequately.

4.2 The SISP success construct

The SISP success construct originally derived from the domain of organisational performance, which has been widely recognised in organisation management theory and strategic management research (Venkatraman & Ramanujam, 1986). Organisational performance is discussed in terms of three different dimensions, as follows:

(I) Operational performance;
(II) Organisational effectiveness; and
(III) Financial performance.

Operational performance is probably one of the most widespread dependent variables used by scholars in organisational research and management studies; however, this variable remains vague in terms of capturing the different organisational performance factors (Rogers & Wright, 1998). In general, operational performance is a complex, multidimensional variable, making its measurement a difficult task (Brush & Vanderwerf, 1992). Most studies in strategic management research use the construct of operational performance to examine a variety of strategy contents and process outcomes (Ginsberg & Venkatraman, 1985). Since SISP is similar to any strategic business planning in strategic management research, it has its own complexity that produces many difficulties to its outcomes measurement (DeLone & McLean, 1992; Sugumaran & Arogyaswamy, 2003; Segars & Grover 2005). Therefore, measuring SISP success is a complex process because of the embedded intangibility of its values and unobservable contribution to specific functionality of overall organisational performance (King, 1988; Newkirka , 2007; Venkatraman, 2008).

It is unreasonable to reduce the benefits of SISP outcomes to simple financial measures such as return on investment, payback or internal rate of return (Venkatraman & Ramanujam, 1986; Sugumaran & Arogyaswamy, 2003; Segars & Grover, 2005). Instead, SISP outcomes can be viewed as the degree of achievement of SISP objectives based on the positive relationship between the values added from IS when it is successfully planned to firm performance. Therefore, SISP objectives should extend to increased organisational performance and competitive advantage (Raghunathan & Raghunathan, 1994; Krell & Matook, 2009). Thus, measuring the objectives of SISP is important to decide on the degree of the planning success. Cigars (1998) suggested that there are four different approaches for assessing the success of SISP; these approaches are as follows: 'goal-centred judgment', 'comparative judgment', 'normative judgment' and 'improvement judgment' '' Table 21 explains each of these approaches.

Table 21: Approaches for assessing the effectiveness of SISP (Albert H. Segars 1998).

Approaches to assess the effectiveness of strategic planning	Explanation	Mode question	Reference
Goal-centred judgment	Seeks to assess the degree of attainment in relation to targets	*To what extent are the multiple objectives (or goals) of planning fulfilled?*	Venkatraman and Ramanujam 1987; King 1988; Raghunathan 1994.
Comparative judgment	This perspective compares the effectiveness of a particular system with other "similar system"(typically those set up in comparable organisations)	*How do our systems's performance compare against similar systems that are operating in comparable organisations?*	Earl 1989
Normative judgment	The systems is compared to "standards of the field" rather than the unique planning goals of the organisation	*How do our systems's performance compare against that of theoretically Ideal systems?*	King 1983; Venkatraman and Ramanujam 1987
Improvement judgment capabilities	The focus is on assessing how the planning systems has evolved or adapted *over time* in supporting organisational planning needs. This approach is particularly useful in cases where systems is in its initial stages	*How the planning systems have adapted to changing circumstances?*	King 1988; Venkatraman and Ramanujam 1987; Raghunathan and Raghunathan 1994

There is suggestion that comparative and normative approaches are associated more with strategic data planning rather than strategic information systems planning. This is because there are focusing on one prospective of information systems components outcomes (Earl, 1989). Since these approaches are usually taking place over limited time which makes them focusing on the narrower sets of outcomes and not on the wider prospective of SISP outcomes the reason which makes them unsuitable in capturing outcome of strategic information systems planning for the entire IS application in an organisation (Segars 1998, Goodhue *et al.*, 1992). On the other hand the other two approaches of goal fulfilment and improvement judgment capabilities give a more appropriate measurement perspective of SISP outcomes, as they tend to be robust in its approaches of its measurement, wider focus, and present a variety of outcomes (Raghunathan and Raghunathan, 1994). These two approaches have previously discussed by Venkatraman& Ramanujam (1987) and they labelled them as:

1. **Fulfilment of Key Planning Objectives**
2. **Improvement in capabilities**

These two approaches were re-validated by Raghunathan & Raghunathan (1994) and later by Grover (1998), who used the approaches to develop an instrument, and decomposed them into four dimensions; three of them (alignment, analysis, and cooperation) represent Venkatraman and Ramanujam's extent of fulfilment of key planning objectives, and the fourth represent the measurement of planning capabilities which represent the improvement in the planning systems judgment capabilities. These four dimensions have been extensively used in quality research to assess the SISP success (Grover 2005; Newkirka & Lederer 2007, Bechor *et al.*, 2009). Given the wider perspective and the nature of this research that investigates, the SISP success measurement of "fulfilment of key planning objectives" and "improvement in capabilities" are favoured as the theoretical bases for conceptualizing SISP success, together these two measurements will be used to represent the output of SISP under different organisational context. After reviewing the options available the discussion now will be focus on measurement items selecting for SISP success constructs. The criteria used in the selection process are based on the nature of the study, where SISP success reflects on a wider range of strategic planning processes as well as related to the organisational context, the second criteria are based on the prior reliability and the validity of the construct measurement items showing in Table (22).

Table 22: Prior reliability and the validity of the construct measurement items.						
Authors	**Context**	**Journal Name**	**Reliability (Cronbach Alpha)[i]**		**Reliability [ii](AVE), (Pc)[iii]**	
Ramanujam (1987)	Conceptualization and an operational model of strategic information systems success data on the planning practice of 202 strategic planning units	*Academy of Management Review*	**Objectives**	0.75	**Objectives**	0.7575 **(Pc)**
			Capabilities	0.87	**Capabilities**	0.88 **(Pc)**
Raghunathan (1994)	An operational model for measuring IS planning systems success sample of 192 I.S executives in different business sectors	*Information Systems Research*	**Objectives**	-	**Objectives**	0.89 **(Pc)**
			Capabilities	-	**Capabilities**	0.92 **(Pc)**
Grover (1998)	550 random sample distributed to CIO, VP, director of MIS, or director of strategic planning in the eastern half of the United States	*MIS Quarterly*	**Alignment**	0.93	**Alignment**	0.70 **(AVE)**
			Analysis	0.89	**Analysis**	0.58 **(AVE)**
			Cooperation	0.91	**Cooperation**	0.60 **(AVE)**
			Capabilities	0.90	**Capabilities**	0.56 **(AVE)**
Grover (2005)	Identify key dimensions of SISP and its effectiveness sample of 600 firms	*Information & Management*	**Alignment**	0.91	**Alignment**	-
			Analysis	0.86	**Analysis**	-
			Cooperation	0.91	**Cooperation**	-
			Capabilities	0.90	**Capabilities**	-
Newkirka a(2007)	A postal survey collected data from 161 I.S executives to measure environmental uncertainty and assess planning success	*Journal of Computer Information Systems*	**Alignment**	>0.70	**Alignment**	>0.707 **(AVE)**
			Analysis	>0.70	**Analysis**	>0.707 **(AVE)**
			Cooperation	>0.70	**Cooperation**	>0.707 **(AVE)**
			Capabilities	>0.70	**Capabilities**	>0.707 **(AVE)**

Initially, all authors used the original items developed by Venkatraman (1987). Raghunathan (1994) and other researchers, including Warr (2004) in a PhD thesis, used these items to measure SISP success. Although the items developed by Venkatraman seems to be comprehensive in covering the scope of SISP success, there is still a little confusion about some elements of the fulfilment of key objective construct in terms of whether it should exogenous or endogenous; this will become problematic in the overall result of measuring the SISP construct, as some items may be repeated or be theoretically invalid. In the light of these problems, Segars and Grover (1998) developed a procedure where they questioned panels of experts using the ivQ-sort technique. The aim of this procedure was to make sure that the meaning associated with each item was made explicit to reflect on the significance of the whole construct and refine the ambiguous SISP success scale (Grover 1998). These scales have been frequently used by researchers in measuring SISP success; the most recent studies were conducted by Segars and Grover (2005), using a 600-firm sample, and Newkirka (2007), using 161 samples after comparing the Segars and Grover scale's reliability and clarity against those of Venkatraman and Ramanujam (1987) and Raghunathan and Raghunathan (1994). This study uses Segars and Grover's (1998) scale to operationalise the SISP success constructs 'capability and fulfilment of key objectives'. The SISP success construct will be measured using multidimensional, multi-item, direct measure scales, as represented in Table (23).

Table 23: Measurement items of SISP Success construct.

The SISP success dimensions	Indicators
Planning *Capabilities*	Ability to anticipate surprises and crises. Flexibility to adapt to unanticipated changes. Ability to identify new business opportunities. Ability to identify key problem areas. Ability to understand the business and its information needs. Ability to gain cooperation among user groups for IS plans. Ability to align IS strategy with organisational strategy.
Planning *Alignment*	Understanding the strategic priorities of top management Aligning IS strategies with the strategic plan of the organisation Adapting the goals/objectives of IS to changing goals/objectives of the organisation Maintaining a mutual understanding with top management on the role of IS in supporting strategy Identifying IT-related opportunities to support the strategic direction of the firm Educating top management on the importance of IT Adapting technology to strategic change Assessing the strategic importance of emerging technologies
Planning *Cooperation*	Avoiding the overlapping development of major systems. Achieve a general level of agreement regarding the risks/tradeoffs among systems projects. Establish a uniform basis for prioritizing projects. Maintaining open lines of communication with other departments. Coordinating the development efforts of various organisational subunits. Identifying and resolving potential sources of resistance to IS plans. Developing clear guidelines of managerial responsibility for plan implementation.
Planning *Analysis*	Understanding the information needs of organisational subunits. Identifying opportunities for internal improvement in business processes through IT. Improved understanding of how the organisation actually operates. Development of a "blueprint" which structures organisational processes. Monitoring of internal business needs and the capability of IS to meet those needs. Maintaining an understanding of changing organisational processes and procedures. Generating new ideas to reengineer business processes through IT. Understanding the dispersion of data, applications, and other technologies throughout the firm.

4.3 SISP process construct

The SISP processes construct domain is the most important component in this study of strategic planning of information systems, as this is where the decision making takes a place. This construct still relatively young compared with the SISP success and organisational context constructs; SISP process research is still a relatively new domain (Earl, 1993; Grover, 2005). According to Mentzas (1997), the SISP process "can be defined as a set of partially ordered steps intended to reach a goal'. From the perspective of classical strategic management theory 'strategy is considered as a deliberate planning process (formal), initiated by top management (top-down), based on an elaborate industry analysis (rational) and aimed at designing a cohesive grand strategy for the corporation (comprehensive)' (Volberda, 2004), as the primary mission of strategy process research has been to analyse how strategy develops. On the other hand, Mintzberg and Lampel (1998, p. 27) defined strategy process as a judgment-based question that contains, intuitive, visioning and evolving learning; it is about transformation as well as sustainability; it must involve individual cognition, social iteration, cooperation and conflict; it has to include analysing before and programming after as well as negotiating during; and must be in response to the environment.

John (2006) defined strategic planning process as a 'Commonly used management process, employed by managers in both the private and public sector to determine the allocation of resources in order to develop strategic performance' (David & John, 2006). Strategy answers two questions: 'Where do we want to go?' and 'How do we want to get there?' The term *strategy* has been broadly divided into two categories: (i) strategy content research and (ii) strategy process research. Strategy content research addresses the subject of strategy itself; it underlines the similarities and differences between strategic units within organisations facing similar situations, such as growth and business environment change. On the other hand, strategy process research tackles actions supporting strategy, and tends to investigate processes that have to do with formulating a strategy stimulated by different factors affecting the overall outcome of strategic planning. Nevertheless, awareness of strategy process and the strategy content research could lead to an exploration of best practices for strategy-process-content and better decision making.

From this perspective, it is worth mentioning that there are differences between leadership judgment viewed traditionally and judgment viewed as a process. The differences have to do with factors such as time, focus, success criteria, leadership orientation, transparency and capability building. However, the main distinction is that judgment is viewed as a process by its very nature; a judgment call leads to outcomes by converting the plan to action. Thus, leaders need a context to call upon, and this is different from vision and content strategy, even though both share similar elements on some occasions (Noel, 2007). There is no solid research background in the field of strategic decision making in developing courtiers, and barely any studies have been conducted in the field of SISP processes.

The findings of a recent empirical study conducted by Elbanna *et al.* (2008) on strategic decision making and it is impact on organisational performance in DCs have two major implications for this research: First, the researchers suggested that has been no difficulty in conducting SISP research in developing countries in regards to research literature and research to date. The measurement they used in collecting data was established in developed countries, but was revalidated in the context of developing countries. They also found that organisational effectiveness is a stronger predictor of strategic decision-making processes rather than of financial performance; this in line with Venkatraman and Ramanujam's suggestion for measuring SISP success. Second, in the process construct, they suggested that there is a positive impact of the rationality of the decision-making process on organisational performance, and this is in line with Segars and Grover's (2005) suggestion that organisations evolve in the direction of increasing rationality in their strategic information systems planning processes.

When measuring the decision-making process in DCs, an interesting variable has emerged from the literature which seems to complete the picture of measuring the SISP process in DCs, although the variable was derived from a study on decision-making processes rather than SISP. This variable labelled as 'intuitive', and it reflects on intuition in the decision-making process. This variable was originally studied by Naresh (2000), who examined the intuitive variable as part of the decision-making process in association with overall organisational performance, and found that there is a link between the intuitive decision-making process and organisational performance in unstable environments (Naresh, 2000). The same variable was tested in terms of strategic planning processes in DCs by Elbanna *et al.* (2009), who tested the variable as a dependent variable in surveying 286 Egyptian managers in different organisations who participate in making strategic decisions; these research also found a link between intuition as a decision-making process and organisational performance, suggesting that high-performance organisation make decisions that are more rational and less intuitive.

Focusing on strategic information systems planning, there is a lack of common understanding of the concept 'strategy' in the field of management of information systems, as observed by Earl (1989), who recognised that there are three levels of strategy as it relates to information systems: (i) information management strategy (IMS), (ii) information systems strategy (ISS) and (iii) information technology strategy (ITS). IMS deals with information systems functionality management in the entire organisation, IS strategy deals with information systems applications and IT strategy has to do with the technology used for deriving application systems (Ragu-

Nathan, 2001). In his book, Peppard (2002, pp. 119-120) stated that IS strategy is a complex issue; he has examined the meanings of concepts used in the literature to study the IS strategy and found that the terms ('strategic information systems planning' [SISP], 'information systems planning' [ISP], 'information systems strategy planning' [ISSP] and 'business systems planning') all are similar in their meaning. He distinguished between two concepts in IS strategy: IS strategy formulation and IS planning. Formulation is concerned with the developing the IS strategy through a certain management process where IS-business alignment, competitive differentiation and value adding are the ultimate goals.

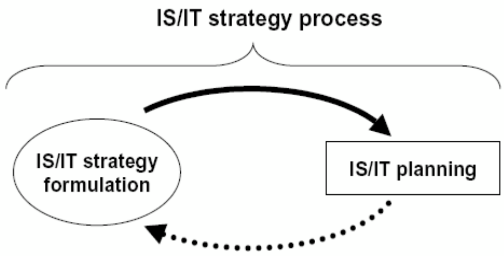


Figure 32: SISP process as presented by, Peppard (2002).

On the other hand, IS planning is the step that comes after the strategic plan formulation, and is concerned with the implementation plan; thus, the IS strategy process refers to both formulation and planning, and this is a continuous process between the formulation and the implementation planning (Peppard, 2002). This research focuses on the planning process of information systems, in particular the strategy process domain, which composes three main elements: the strategist, the context and the consequence of actions (Hutzschenreuter & Kleindienst, 2006). As Fredrickson and Mitchell (1984) state, 'It is suggested that strategic decision processes are patterns of behaviour that develop in organisations, and as such can withstand the turnover of personnel as well as some variation in the actual behaviours people contributes. It is the persistence of the pattern through contributions made by interchangeable people that distinguishes organisations from other collectivities, similarly, though patterns of decision making may change as organisations evolve, evidence suggests that organisation patterns tend to outlive their founders' (Fredrickson & Mitchell 1984). In reality, the strategic decision process is complex; it has many dimensions and many factors influencing the output of such decisions. These factors may be tangible or intangible and the interruptions and response to any factors can be different from one manager to another, depending on their level of knowledge and analyses for current and future situations; the level of interruption, resistance and negative forces may also differ in different context (Elbanna *et al.*, 2008). In terms of the strategic decision-making process related to information systems, Krell (2009) argued that there are two major SISP approaches: formal SISP and intuitive SISP. Formal SISP is based on formal planning methods and often involves senior managers (Salmela *et al.*, 2000); intuitive SISP relies on informal strategic decisions that are based on personal experiences (Sambarmuthy *et al.,* 1994). The outcome of formal SISP is determined by the formal SISP methods used; thus, the selection of a method affects the firm's strategic IS plan (Salmela *et al.,* 2000; Krell & Matook, 2009). On the other hand, the outcome of intuitive SISP is determined by the cognitive input of the planner.

4.4 SISP Process characteristics

The SISP process is characterised by its dynamic nature, evolving in line with technological advancements; thus, firms are continuously searching for new ways to leverage information, knowledge and IT in support of their strategic goals and competitiveness (Grover & Segars, 2005), including the following:

- Searching for competitive and value-adding opportunities;
- Searching for broad policies and procedures for integrating, coordinating, controlling and implementing IT resources; and
- Searching to leverage information, knowledge and IT in supporting strategic goals and competitiveness.

Hence, the SISP process is an on-going process, where decision makers have to look at the alternatives and select the best in order to support a business strategy that adds value. While decisions have to be made at a certain time in a given organisational context, it should also be noted that business environments do not remain unchanged all the time. Organisational context changes, so businesses need to adapt to these changes; in this case, the SISP processes should consider flexibility and adaptability to future change within or outside the organisation in order to produce effective and value-adding information systems. SISP is a methodology that can be looked at from different dimensions: assessing the environment, considering strategic alternatives, selecting a strategy and planning the execution of the strategy (Mentzas, 1997; Chia, 2005). Furthermore, researchers have suggested that both too little and too much SISP can be unfavourable to SISP success (Premkumar & King, 1992; Raghunathan & Raghunathan, 1990; Earl, 1993; Sambamurthy, 1994; Newkirka , 2003). Too little concern with SISP could lead to inadequate understanding of the external environment, internal organisational context and emerging information technology (Premkumar & King, 1992). On the other hand, over concern with SISP costs effort and large financial commitments to endorse a fundamental change within an organisation's infrastructure and the internal organisational context; sometimes, emerging information technology can make the plan obsolete before it is even implemented (Sambamurthy, 1994; Min, 1999).

In the same context, SISP methodologies have also been extended to individual, behavioural, organisational and environmental factors (Chan, 1998; George, 2003). Thus, careful planning should concern the best possible level of comprehensiveness of different organisational factors to avoid failure in the information systems plan (Henry, 2003). This study seeks an SISP pattern that can comprehend all these characteristics. Given that strategic planning is an evolving pattern of process, dimensions and characteristics that reflect on the behaviour of managers responsible for accomplishing such planning (Fredrickson, 1984; Grover, 2005), in the IS literature there are deviations among this pattern of process characteristics. This has been recognised by major SISP scholars such as Sabherwal and King, Earl, Grover, Lederer and Pyburn, all of whom have described SISP process through different patterns and provided rather a fragmented representation of SISP process characteristics. In this context, Segars *et al.* (1994) argued that the process characteristics of planning systems should be structured or internally co-aligned. Working within this theoretical vein and within the context of SISP, Segars and Grover (1998) developed a pattern for SISP processes where they closely analysed prior studies on SISP processes and used a model where the SISP process was clearly illustrated. Later, they identified SISP process stages in their model (Segars & Grover, 2005). According to Grover (2005) the 'majority of SISP studies focuses on planning content, with particular interest in the methods and measurement of alignment between business and IS strategies, however, prior studies in IS strategy research have not largely captured the organisational aspects of planning'.

As mentioned above, scholars have differentiated between the content and process aspects of planning. On the process side, SISP scholars have endeavoured to recognise a pattern of SISP processes to include planning dimensions, actions and behaviours (Pyburn, 1983; Earl, 1993, Grover, 2005, Lederer *et al.*, 2008). For example, in an early study, Pyburn established planning patterns in information systems from case study research; he reported that these patterns exist in different forms, from a rational (structured) process such as written rules and procedures, a top-down planning flow, budgetary focus and narrow participation profiles, to personal informal planning systems reflecting on more adaptable processes based on few guidelines or policies, such as bottom–up planning flow, a creativity focus and wide participation profiles. A similar study carried out by Earl distinguished between SISP approaches based on degree of rationality and adaptability as main characteristics of planning systems. Here, the researcher developed a taxonomy comprising the five following approaches:

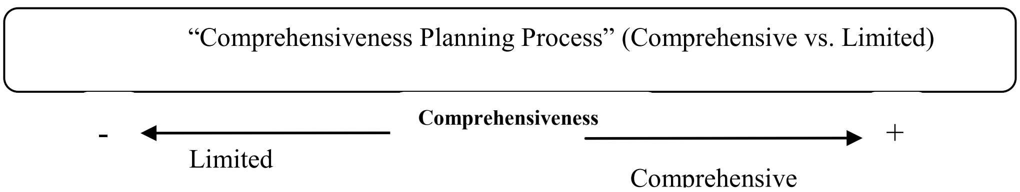
- Business led;
- Method driven;
- Administrative;
- Technological; and
- Organisational.

Earl's organisational approach reflected on IS strategies that emerge from on-going organisational activities which are normally found in an unsettled business environment, such as trial and error changes to business practices, continuous enhancement of existing applications and systems experiments within the business. In other words, organisational polices, participation and consistency in planning were used to formulate IS strategy. On the other hand, Earl's administrative approach revealed rational characteristics of planning information systems such as adopting rules and procedures, budgetary control, narrow participation profiles and annual or semi-annual planning activities.

In an in-depth review of Pyburn and Earl's studies of the planning process, Grover suggested that hybrid organisational planning for information systems appears to be more effective than the highly structured and less-adaptable rational approaches. This means that the effective planning systems should contain both rational and adaptive approaches in the planning process. In the same context, Lederer and Salmela (1996) suggested that there are two major SISP approaches: formal SISP and intuitive (or informal) SISP. Lederer *et al.* (2008) examined SISP in terms of the practicality of its activities and tasks; they deployed Mentzas' (1997) phases to measure the SISP process his research argues that these phases and tasks represent the components of the planning processes, where each component has its own objectives, participants, preconditions, products and techniques. Since the aim of this research is to assess the organisational context and its impact on SISP processes that reflect the general behaviour of decision makers, we found that Mentzas' model is inappropriate here. Moreover, Segars and Grover (1998, 2005) described and measured planning process dimensions through extensive analysis of both the strategic management and SISP research and they have identified six important processes dimensions of SISP; these dimensions are robust in describing SISP processes far beyond a methodologically basis, and are less generalisable in describing planning, while complementing and further structuring general 'approach'-based descriptions. The *co-alignment* of these processes and planning stages explain the behaviour of decision makers to accomplish planning tasks. Therefore, this study will adapt the Segars and Grover's SISP process pattern as a measurement model of SISP processes. These dimensions are explained in detail below.

4.5 SISP comprehensiveness process

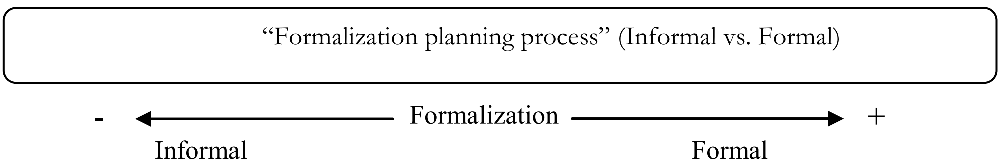
Planning comprehensiveness is a measure of SISP process rationality and defined as 'the extent to which an organisation attempts to be exhaustive or inclusive in making and integrating strategic decisions' (Fredrickson & Mitchell, 1984). This definition has been utilised in the field of strategic information systems planning to describe the extent or scope of efforts put into making decisions regarding information systems solutions (Lederer & Sethi, 1996; Sabherwal & King, 1995; Sambamurthy, Zmud, & Byrd, 1994). Whilst comprehensiveness is a basic and very important measure of the decision-making process, it is not the only measure and has not maintained a role as an overall measure of the strategic decision-making process. According to Janis and Mann (1977), the characteristics of comprehensiveness include the following: 1) systematically searching for a wide range of alternatives; 2) dealing with a full range of objectives; 3) carefully evaluating the costs and risks of a range of consequences; 4) intensively searching for information to evaluate alternative actions; 5) objectively evaluating information or expert judgment regarding alternative actions; 6) re-examining the positive and negative consequences of all known alternatives; and 7) making detailed plans, including consideration of contingencies, for implementing a chosen action. Despite these characteristics of comprehensive decision making, academics interested in both information systems and strategic management research (Sabherwal & King, 1995; Sambamurthy *et al.*, 1994; Eisenhardt, 1989; Mintzberg, 1978; Quinn, 1978) have suggested that in some competitive contexts, it may be more appropriate to compromise rather than optimise in identifying and evaluating strategic alternatives (Bordley & Kirkwood, 2004; Grover, 2005). Fredrickson and Mitchell (1984) found a negative relationship between comprehensiveness of the strategic decision-making process and organisational performance under unstable organisational environment.



Construct	Indicator
Comprehensiveness	• We attempt to be exhaustive in gathering information relevant for IS planning. • Before a decision is made, each possible course of action is thoroughly evaluated. • We attempt to determine optimal courses of action from identified alternatives. • There is little trial and error in our strategic decision process. • We will delay decisions until we are sure that all alternatives have been evaluated.

4.6 SISP formalisation process

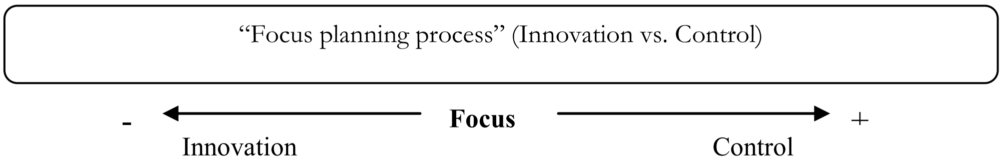
The strategic information systems planning formalisation process refers to the extent of planning process structures, techniques, written procedures and policies. These characteristics direct the planning to reach a decision in terms of selecting a suitable information system (Lederer & Sethi, 1996; Das *et al.,* 1991; Dutton & Duncan, 1987). The rationality of the planning process is amplified when the formalisation of such planning increases and the planning process becomes more of a systematic process to construct strategic plans (Sabherwal & King, 1995; Premkumar & King, 1994; Grover, 2005). The output of the formalisation procedure is efficiency in the information gained and efficiency in the process of such information. The planning under formalisation tends to be a more systemised and accumulated process of acquiring, processing and storing information related to strategic planning; thus, formalisation helps in organisational learning and decisions based on a formalised planning process lead to better identification of strategic issues (Grover, 2005). Conversely, the formalised process should be balanced between the organised process and the degree of rigidity, so that when a strategic issue arises, swift and efficient responses should be put in place rather than a bureaucratic process that may delay dealing with the issue (Lederer & Sethi, 1996; Sabherwal & King, 1995; Earl, 1993).



Construct	Indicator
Formalization	• Policies and procedures greatly influence the process of SISP within our firm. • We utilize formalized planning techniques (e.g.. IBM) in our SISP process. • Our process for strategic planning is very structured. • Written guidelines exist to structure strategic IS planning in our organisation. • The process and outputs of strategic IS planning are formally documented.

4.7 SISP focus process

The SISP focus process has to do with the equilibrium between innovation and control (Chakravarthy, 1987). Studies within strategic management, as well as IS, have explained this difference in terms of two contradictory concepts: innovation and integration. An innovative planning orientation enables creativity in the planning process; it helps planners to systematically appraise opportunities and threats in the business environment and then decides on innovative IS solutions to enhance the organisations competitive advantage (Grover, 2005). On the other hand, the integrative orientation of the planning process is more focused on control. Here, strategic planning uses figures and statistics; it is more rational from the viewpoint that it is consistent with the regular accounting and budgetary systems of an organisation and is concerned with issues such as resource allocation and cost performance measures (Grover, 2005). We argue that trial and error will be higher in the innovative planning orientation than in the control planning orientation.



Construct	Indicator
Focus	• The primary focus of IS planning is controlling cost through extensive budgeting. • In our IS planning process we encourage creativity and idea generation over control. • Strategic IS planning is viewed as a means of controlling the growth of technology. • Control systems are used to monitor variances between planned actions and outcomes. • Our IS planning process is tightly integrated with the firm's normal financial planning or capital budgeting routine.

4.8 SISP flow process

Planning flow refers to decision-making autonomy within an organisation regarding strategic information systems planning; it is about who has the responsibility and the power to initiate the planning process (Byrd *et al.,* 1995; Chakravarthy, 1987; Earl, 1993; Dutton & Duncan, 1987). Flow is described in both IS and strategic management literature as 'top down' (from top management to lower levels of the organisation) or 'bottom up' (from lower levels of management to higher corporate levels) (Grover, 2005). A top-down planning flow is considered to have limited influence from the SBU and operational managers in the initiation of the planning; instead, CEOs and CIOs are supposed to have the power to formulate the strategic IS plans in the organisation. On the other hand, a bottom-up planning flow is considered to be an IS plan where the SBU and operational managers have greater influence in the initiation and formulation of strategic planning regarding information systems. In bottom-up planning, there is usually a mechanism where feedback, initiatives and proposals are integrated into the overall corporate plan (Pyburn, 1983), and the role of top management is to supervise, support and integrate the outcomes from various organisational levels and subunits into an overall plan for the information systems (Grover, 2005).

"Flow planning process" (Bottom–up vs. Top–down)

- ← Bottom–up **Flow** Top–down → +

Construct	Indicator
Flow	• Strategic planning for IS is initiated at the highest levels of the organisation. • The planning flow within our organisation can be characterized as "top down." • Planning for IS is initiated by requests/proposals from operational/functional managers. • Those who formulate strategic IS plans are most responsible for their implementation. • The primary role of upper management is to endorse rather than formulate IS plans.

4.9 The SISP participation process

The SISP participation process focuses on the vertical planning of information systems within the organisation; it captures the width of involvement of information systems in strategic planning (Grover, 1998). The participants involved in planning processes vary from one organisation to another (Lederer & Sethi, 1996; Kearns, 2007). In the SISP process, there are two main contradictory assumptions that characterise of systems planning. The first assumption is that the organisation makes its strategic decision with narrow participation from the stakeholders. This approach foster limited involvement of participants from different levels of an organisation in planning formulation; it may also be adopted where the lower level of an organisation lacks knowledge of the strategic direction and business in general. Another possibility where the narrow participatory approach is adopted in the planning process is where there is some degree of stability in strategic issues facing an organisation, where formulating a strategic plan is more of a systematic repetition and not a major shift in the organisation's direction (Lederer & Sethi, 1996). The second assumption is where the process of formulating a strategic plan involves broader participation from all levels of an organisation; such an approach may be necessary to balance the swift response to the dynamic nature of the competitive environment and formulate an adaptable strategic plan (Grover, 2005).

"Participation planning process" (Narrow Participation Profile vs. Broad)

- ← Narrow **Participation** Broad → +

Construct	Indicator
Participation	• Top management are actively involved in strategic IS planning. • A variety of functional area managers participate in the process of IS planning. • Our process for strategic IS planning includes numerous participants. • Strategic IS planning is a relatively isolated organisational activity. • The level of participation in SISP by diverse interests of the organisation is high.

4.10 SISP consistency process

The consistency process represents the regularity of planning activities and how often the evaluation/revision of strategic choices is conducted within an organisation (Lederer & Sethi, 1996; Sabherwal & King, 1995; Judge & Miller, 1991; Chakravarthy, 1987; Eisenhardt, 1989). Some organisations tend to have inconsistency in evaluation and revision of their strategic direction. In this case, the time frame will be longer before they meet to discuss, appraise and update current challenges and changes. Meetings in between the official time frame would be more informal and irregular; the planning cycles may be on a yearly basis. In contrast, in consistent planning activities, open office policy, and regular face-to-face meeting, constant communication and frequent assessment and revision of strategic directions will be the dominant features among planning participants (Byrd *et al..,* 1995; Judge & Miller; Grover; 2005). A low level of consistency may be justified in contexts in which there are few strategic issues and the environment is relatively stable (Sabherwal & King, 1995; Premkumar & King, 1994); in contrast, a high level of planning consistency may be needed to adapt to unexpected changes in a competitive environment (Das *et al.,* 1991; Eisenhardt, 1996).

"Consistency Planning Process" (Low vs. High)

\- ← **Consistency** → +

Low **High**

Construct	Indicator
Consistency	• We constantly evaluate and review conformance to strategic plans. • We frequently adjust strategic plans to better adapt them to changing conditions. • Strategic IS planning is a continuous process. • We frequently schedule face-to-face meetings to discuss strategic planning issues. • We formally plan for information systems as the need arises.

4.11 Intuition process

Since strategic planning is about the 'future', change in the planning context remains unknown and is not fully comprehended in the planning process mechanism; in such a situation, managers apply personal judgment to define the problem and then develop appropriate alternatives to consider. Thus, intuitive SISP relies on informal strategic decisions that are based on personal experiences (Sambarmuthy *et al.,* 1994). At this point, managers' cognitive biases can adversely affect the decision-making process (Klayman & Schoemaker, 1993); therefore, in this study we have introduced the intuition construct to the SISP planning process dimensions. This construct has primarily emerged in the field of strategic decision management and organisational science. In his book, *The Rise and Fall of Strategic Planning*, Mintzberg (2000) described the concept of 'strategic plans' as an oxymoron. He argued that strategy cannot be planned because planning is about analysis and strategy is about synthesis. This is why he emphasised that such a planning process has failed so often and so considerably. However, some might argue against this notion and try to maximise the operationalisation of the strategic planning of information systems (Grover, 2005). Still, there is agreement on the dynamic nature of strategic planning as a response to its context, and this is why the processes of SISP have to adapt to dynamic organisational contexts.

In light of the SISP process, 'intuition' as an approach to formulate planning decisions does not contradict rationality, nor is it a chaotic process of guessing; rather, it is a complicated form of thinking, stimulated by years of experience in specific jobs involving problem solving skills, which requires a complete understanding of business details to the extent of knowing the logic of the business context inside out (Prietula & Simon, 1989). Therefore, intuition is a 'synthetic psychological function in that it apprehends the totality of a given situation' (Vaughan, 1990). In terms of swift, individual-based cognitive decision-making, the use of intuitive synthesis has been found to be positively associated with organisational performance in an unstable environment; however, it is negatively associated with organisational performance in a stable environment (Khatri & Ng, 2000). In evaluation of intuition as a strategic decision making process, Khatri and Ng, (2000) surveyed executives in computer, banking and utility industry firms in the US. They found that intuitive processes of decision-making are commonly used in these industries. Thus, intuition has been recognised as an important dimension of the strategic decision-making process in the management field (Elbanna, 2009). However, few empirical studies have been conducted on the role of intuition in strategic decision making and its influence on the success of SISP. Nevertheless, to complete the sequence of the SISP process in developing countries, this research argues that some firms in such countries do not have sufficient resources or ability to tolerate the expenditure of the adopted or rational processes of SISP. There may be challenges in terms of the availability of IT resources and a flexible organisational structure, the ability to analyse and formulate clear policies and procedure, consistency in the decision planning process and the cost of hiring outsiders; given that the environment in developing countries is frequently unstable, executives often base their decisions on intuition and abandon adopted and rational processes of decision making. Moreover, this research argues that as an intuitive decision-making process becomes more frequent, the realisation of the SISP process adaptability mechanism is possible over time. The intuition construct as a dimension of decision making has been measured by Khatri and Ng (2000) in relation to the degree of relying on personal judgment, depending on gut feelings and placing emphasis on past experience.

"Intuition planning process" (Low vs. High)

\- ← **Intuition** → +

Low — High

Construct	Indicator
Intuition	• We rely on personal judgment when planning for Information Systems • We depend on our gut feeling when planning for Information Systems • We emphasize past experience when planning for Information Systems

4.12 SISP context construct

There is no doubt that the operationalisation of the SISP context construct is far more complex than it is in the SISP process and SISP success; this is because there is complexity when it comes to defining and differentiating between SISP context, MIS context and organisation context; in addition, the construct itself is regarded as contingent variable, which naturally will have a problematic scope in relation to the decision-making process. In his article 'Beyond Contextualisation: Using Context Theories to Narrow the Micro-Macro Gap in Management Research', Bamberger (2008) discussed context theory and the advancement in statistical technology to close the gap between micro-macro (operational and strategic) levels in management research. He concluded that the classical management and social theories—including theory discussing the organisational context—demand more appreciation. Bamberger commented that with 'The absence of more holistic, context theorizing of both, the macro and micro levels, our new tools (statistical tools) will likely fail to deliver the expected dividends. Such theorizing demands that we introduce our students to a broader range of paradigms and perspectives and give them the tools they need to create new theories explaining the relations between structures, environments, and time frames on the one hand, and attitudes, cognition, and behaviour on the other. In going down this path, we are returning to the classical social theorists, such as Weber and Freud, who understood that micro and macro are inextricably linked and that robust theory in the social sciences demands an appreciation of how individuals both shape their context and are shaped by it' (Bamberger, 2008). The contingency theory in MIS is rated number three in the top five MIS theories (Scott, 2009). In this study, the author will investigate the SISP context according to the contingency theory of information systems. The SISP context is a factor that creates mixture in organisational context, where the organisational context generates the SISP context, which in turn affects the formulation of the IS planning approach (Grover, 2005).

4.13 The domain of the SISP context

Rousseau (1978) defined context as 'The set of circumstances or facts surrounding an event ... Context can refer to characteristics of the organisational setting, of the individual, of his or her role in the organisation, and of any other environmental factor that may shape responses' (p. 522). Many authors have used different contextual variables in their strategic management research. However, before the development of any strategy, it is important to understand the context within which this strategy is being developed. This is likely to differ from one organisation to another, but in general, the domain of organisational context related to strategy formulation has been well established, and many books and articles have discussed this and used different variables to study different relationships. Still, the organisational context construct remains one of the most complexes construct to study due to its dynamic and situational nature and lack of systematic consistency.

The paradigm of the SISP context as it perceived in the SISP literature is slightly different from that which has been extensively reported in the fields of organisational theory and organisational development literature in that the literature of organisational theory and organisational development infrequently mentions the role of IS within the organisational context. Henderson and Venkatraman's (1989) famous model of strategic alignment, 'A Framework for Strategic Information Technology Management', has been perceived as a meta-theory, or the theory about theories; this model was developed using two fundamental dimensions: strategic integration and functional integration. In the words of Henderson and Venkatraman, 'One could easily imagine a set of organisational context factors (contingencies) that would result in working to improve the effectiveness of a given planning process' (Henderson & Venkatraman 1989). This suggests that the organisational context plays a major role in formulating a strategic plan for information systems; thus, the SISP context can be strongly grounded in organisational theory and organisational development literature. When studying the organisational context, one must identify how it relates to the nature of the research.

4.13.1 Criteria for selecting SISP context in this study

Given the complex construct of SISP context, this research will endeavour to stay within the scope of the contingency variables outlined in the contingency theory of IS (Weill & Olson, 1989); however, we will seek updated contingency variables measurement scales and try to contribute to the construct measurement of these variables. The challenge is to identify what SISP context that is most important for this research; in order to do so, the author must refer to research criteria. In the current study and according to the theory applied in this research, the main criterion is SISP success. Now we can alter the question to ask which SISP context is most important to SISP success. Considerable research has been conducted on the SISP context as representing contingent variables related to SISP process and SISP success, and all of this complies with the contingency theory of information systems. In this research, the author can justify the SISP context selected in the research model by looking at each variable from the theory separately and developing this using an instrument development methodology.

4.13.2 Analysis of the organisational context variables in SISP research

Contingency variables of interest to SISP researchers include strategy, structure, size, environment, technology, task and individual characteristics (Weill & Olson, 1989). The concept of SISP context and its incorporation into the decision-making process of strategic planning for information systems was first introduced by Ein-Dor and Segev (1978); since then, it has been developed as a dynamic and on-going concept. In the following discussion, the author will analyse the variables used in the SISP context, task, strategy, structure, size, environment, technology and individual characteristics.

4.13.2.1Task

Task refers to the end-user of the systems; this variable is usually discussed in the information systems implementation stage and not in the planning stage, which is a post-implementation stage (Philip, 2007). However, it has also been argued that the end-user is not related to SISP. An end-user task is usually measured as how well the individual is prepared for the new task created by implementing a new IS, and this can be done through training. Research on implementing IS typically models a direct effect of training on implementation success. Gallivan *et al.* (2005) argued that this view is incomplete, as it does not include the effect of situational contingencies that influence the effect of training. From this perspective, Philip (2007) identifies two situational contingencies that influence the effect of training on end-user adoption and successful implementation, namely the complexity of the technology and task interdependence. The author's argument is that these variables and perhaps other contingency variables impact the comprehension and adoption a task to ensure successful implementation; these can only be useful to SISP if an organisation has updated information systems that are already being used and are familiar to the end-users in that organisation. If this is the case in some organisations highlighted by this study, then different variables need to be incorporated as context variables of SISP to measure the effect of end-user knowledge.

Terry *et al.,* (2006), recognised the role of end-users in the process of SISP, combining the IS personnel, senior management and end-users variables to measure a construct labelled IT advisory committee. The purpose of the IT advisory committee is to serve SISP as the ideal mechanism for the exchange of information among the three stakeholder groups (Terry *et al.,* 2006). Furthermore, this is where end-users can express their view on the current IS or proposed IS plan. This will lead the research in one of two directions: The first direction is related to the decision-making process mechanism and how decisions are made. This has already been covered in SISP process construct. The other direction is the culture and leadership style, which has been covered this direction under the context construct 'leadership style'. This suggests that the end-user task is not related to SISP context, but rather is qualified under the post-planning stage for information systems; thus, logically, it will not be considered as a direct SISP context.

4.13.2.2 Organisational strategy

Organisational strategy is an important factor in contingency theory as applied to strategic information systems. Organisational strategy can be measured using different typologies for the corporate and business levels (Beard, 1981). In the strategic management literature, two measures of the strategy are well documented. The most popular one is the Miles and Snow typology (Miles, 1978; Meyer, 1978) of prospectors, defenders, reactors and Analysers, which has also been used in previous information systems research (Sabherwal, 2001; Brown, 1997). Some SISP researchers have adopted this typology (Dong *et al.*, 2008). The second measure is the strategic orientation of business enterprise (STROBE) framework by Venkatraman (1985; 1989), which includes six dimensions: aggressiveness, analysis, defensiveness, futurity, pro-activeness and Riskiness. Both Can (1992) and Alan's (2004) frameworks have been previously assessed for reliability and validity. Although Miles and Snow's typology is less complex and easier to adopt because it has fewer dimensions, the STROBE framework has proven to be more suitable for PhD research (Costa *et al.*, 2006; Gupta, 2006; Anggraeni, 2009), as it covers a wider typology of strategy which can be filtered down to fit the sample strategy type. Leading SISP researchers have often used the STROBE framework as a business strategy measurement model (Venkatraman, 1989, Alan, 2004; Chan, 1992; Bergeron *et al.,* 2004). In this study, we will follow the path of leading SISP research and apply the STROBE framework to measure the strategic orientation of our selected sample.

Table 24: Business strategy constructs measurements.

Business Strategy					
Author / Dimensions	Venkatra-man (1989)	Chan (1992)	Alan (2004)	Bergeron (2004)	Prior Validation
Aggressiveness	☑	☑	☑	☑	☑
Analysis	☑	☑	☑	☑	☑
Defensiveness	☑	☑	☑	☑	☑
Futurity	☑	☑	☑	☑	☑
Proactiveness	☑	☑	☑	☑	☑
Riskiness	☑	☑	☑		☑

Indicators	
Aggressiveness	Degree to which the organisation sacrifices profitability to gain market share Degree to which the organisation cuts prices to increase market share Degree to which the organisation setting prices below competition Degree to which the organisation seeking market share position at the expense of cash flow and profitability
Analysis	Degree to which the organisation emphasize effective coordination among different functional areas Degree to which the organisation use information systems provide support for decision making Degree to which major decisions are addressed by trying to develop answers through analysis Degree to which the organisation use of planning techniques Degree to which the organisation use of the outputs of management information and control systems Degree to which the organisation manpower planning and performance appraisal of senior managers
Defensiveness	Degree to which the organisation regularly updates and modifies manufacturing technology Degree to which the organisation use of cost control systems for monitoring performance Degree to which the organisation use of production management techniques Degree to which the organisation emphasis on product quality through the use of quality circles
Futurity	Degree to which the organisation utilise long term criteria for resource allocation Degree to which the organisation emphasize basic research to provide future competitive edge Degree to which the organisation depend on forecasting as key indicators of operations Degree to which the organisation formally adopts, "What-if " analysis of critical issues
Proactiveness	Degree to which the organisation constantly seeking new opportunities related to the present operations Degree to which the organisation is the first ones to introduce new brands or products in the market Degree to which the organisation constantly on the lookout for businesses that can be acquired Degree to which the organisation generally prevent competitors to expanding ahead
Riskiness	Degree to which the organisation operations can be generally characterized as high-risk Degree to which the organisation does not adopt a conservative view when making major decisions Degree to which the organisation does not approve projects on a "stage-by-stage" basis rather than with "blanket" approval Degree to which the organisation intend to support projects where the expected returns are certain Degree to which the organisation operation generally followed the "trial and error" paths

4.13.2.3 Organisational structure

The structural dimension is most commonly found in organisation theory and IS studies (Bergeron, 2004). According to Handel (2003), the measurement should begin with the ideas of what organisation characteristics need to be measured. These are not ideas that must be developed, but rather well-measured dimensions that can be clearly defined for scientific research. There are many measures of organisational structure, and these can be described in several ways (Fry, 1982; Daft, 1998; Donaldson, 2001). According to Daft (1998), 'Structural dimensions provide labels to describe the internal characteristics of an organisation. They create a basis for measuring and comparing organisations' (p. 15). Morton and Hu (2004) noted that commonly used structural dimensions include centralisation, specialisation, standardisation, formalisation, hierarchy levels, etc. They also cited Fry (1982), noting that the latter uses centralisation and formalisation to assess technology-structure relationships.

Different researchers tend to use dimensions based on their research purposes (Ifinedo and Nahar, 2009). In SISP research, the author found that the soundest valid measurement of organisational structure was introduced by Hickson (1990) and validated by Alan (2004). These measurements are applicable both in public and private sectors. After reviewing the SISP literature and organisation literature regarding the structural dimension, we found that some sub-dimensions are more relevant to this study than others. Therefore, this research will focus on the following five sub-dimensions: centralisation, formalisation, integration, planning resources, size/maturity and complexity, which we believe are adequate for assessing organisational structure in this study.

Organisational centralisation is decision-making power in the hands of a small number of individuals (King & Sabherwal, 1992; Daft, 1998). Sullivan (1988) suggested that SISP is not a single process action, but rather an interactive learning process relating multiple contributors and stakeholders (Reponen, 1993). In addition, Parker (1995) stressed that in a more federalist organisation, employees at lower levels contribute less toward IS decision making compared to senior employees; thus, decisions may be perceived as more politically motivated. Research on IS planning faces problems in achieving internal consistency and effective implementation if decision-making processes are too centralised (Pai, 2003). Moreover, Wang and Tai (2003) examined the phenomena of decreasing the use of needed skills and knowledge in SISP through growing organisational centralisation, and found that they deferred improvements in the SISP process (Lin, 2006). On the other hand, the formalisation dimension is the degree to which rules and procedures are clearly documented and made known to all employees (King & Sabherwal, 1992). In the integration dimension, we measure the planning mechanism in the organisation, which is important in this study as it reflects on SISP process and success constructs. This dimension has been used by Sabherwal and King (1992) and validated by Alan (2004).

Another sub-dimension that it is important to measure in this study is the planning resources available to the organisation; this falls under the structural dimension (King, 1988; Premkumar & King, 1994). IS planning resources can be viewed as made up of three constructs (Newkirka & Albert, 2007): Technical resources and planning resources focus on particular information technologies such as application software, systems software, hardware and network communications, whereas personnel resources focus on more people-oriented concerns such as technical training, end-user computing, facilities and the personnel themselves (Mirchandani, 2004). Personnel resources are resources that are available before making any decisions and this sub-dimension should not reflect on the resources available after the plan is made. Another indicator of personnel resources is the access to experienced external consultant (Lederer, 1996), which was found to be an important aspect of personnel resources. Data security planning resources focus on protecting the organisation from unwanted intrusion and recovering from such intrusion if and when it occurs (Anderson, 2002).

The other two sub-dimensions the study assesses are size/maturity and complexity. Size/maturity relates to the size by the total revenue of the organisation, while maturity is measured by the number of IS/IT employee and the budget dedicated to IS/IT departments (Pyburn, 1983; Carr, 2003). The complexity dimension assesses factors such as the position hold by the informant, organisational ownership, years of experience in IS and the nature of the organisation's business) (Olson & Chervany, 1980).

Table 25: organisation structure constructs measurements.

Organisation Structure							
	Sabherwal (1992)	Olson (1980)	Carr (2003)	Newkirk a a (2007)	Alan (2004)	Bergeron (2004)	Prior Validation
Centralisation	☑				☑	☑	☑
Formalisation	☑				☑	☑	☑
Integration	☑				☑		☑
Planning Resource				☑			☑
Size/Maturity		☑	☑		☑		☑
Complexity		☑			☑		☑

Dimensions	Indicators
Centralisation	Extent to which decisions on new capital investment are centralised Extent to which decisions on new products are centralised Extent to which decisions on new customer groups are centralised Extent to which decisions on pricing are centralised Extent to which decisions on the hiring or firing of senior personnel are centralised
Formalisation	Degree to which procedures exist for all situations Degree to which rules and procedures are written Extent to which employees are constantly checked for rule violation Degree to which there are strong penalties for violating procedures Degree to which rules are ignored or informal agreements are reached
Integration	Degree to which planning is used as an integrating mechanism Degree to which bargaining between heads of functions is used as an integrating mechanism Degree to which informal interaction between functions is used as an integrating mechanism Degree to which functions mutually support and re-enforce decisions
IS Resources	Core and support application Network communications resources Input, process, output hardware resources Technical training resources End-user computing resources Experienced external consultants resources Data security resources Disaster recovery resources
Size/Maturity	Maturity by the number of IS/IT employee Years of experience in the IS Size by the total revenue of the organisation, and the budget dedicated to IS/IT Department
Complexity	Organisation ownership, Nature of the organisation business

4.13.2.4 Organisational culture and leadership

There is a strong body of opinion suggesting that organisational culture can be consciously designed and manipulated by leadership (Weiling Ke, 2008). Leadership participation and support has been found to extensively influence IT project performance by means of importing external knowledge and integrating internal knowledge in the decision-making process (Mitchell, 2006). In a study of a large sample of companies in Singapore, Teo and Ang (2001) found that one of the major IS planning problems is the lack of support from senior managers in the three stages of planning, specifically launching, development and implementation. This confirms the view held by a number of other scholars (Lederer & Sethi, 1992a, 1992b; Teo & King, 1996). Senior executives should play a proactive role in providing leadership, vision and coordination, and ensuring that the resources are made available; most importantly, the leadership needs to interfere if action plans are diverted for their main objectives; at this point, senior managers ought take immediate remedial action to move the situation forward in the right direction (Philip, 2007).

Many researchers have expressed the view that the support and participation of senior management in SISP processes are critical factors to the success of planning (Brown, 1994; Terry *et al.*, 2006; Kearns, 2007). Whether IS is considered in a strategic context or not, it is generally accepted that the management's efforts surrounding the technology play a pivotal role in ensuring its successful use (Booth & Philip, 2005). It is evident that the most important stakeholder group participating in the SISP process is that of the leadership which holds responsibility at a strategic level of business and IT management, namely CIOs and CEOs (Huigang, 2007; Kearns, 2007; Newkirka , 2008). On one hand, CEO support of SISP may depend upon the perceived value of IS as an asset, while CIO support of SISP may depend upon an understanding of business functionality, the overall strategic vision and sense of direction (Raghunathan, 1989; Applegate, 1992). Support is more likely to exist when the CEO and CIO are both aware of IS as strategic assets (Kearns, 2006).

4.13.2.5 The competing values framework of leadership

To capture the effect of leadership value on the SISP process, this study is concerned with the intermediate level of organisational culture. It applies the competing values framework of leadership (CVF) (Quinn, 2006); it has been stated that 'The study and practice of business strategy is fundamentally based on employing creative solutions to differentiate a firm from its competitors. Theories used to describe the causes and consequences of strategic differentiation tend to focus on organisation-level characteristics such as resources, capabilities and structures. However, less is known about day-to-day processes and practices whereby strategic managers developing creative solutions is necessary to establish strategic differentiation' (Cameron M. Ford, 2008). The main reason for selecting CVF as a measurement model for leadership is that it is compatible with the SISP process phenomenon under investigation. The following seven points demonstrate the advantage of selecting CVF:

- It is practical: It captures key dimensions of culture that have been found to make a difference in the organisation's success;
- It is timely: The process of diagnosing and creating a strategy for change can be accomplished in a reasonable amount of time;
- It is involving: The steps in the process can include every member of the organisation, but they especially involve all who have a responsibility to establish direction, reinforce value and guide fundamental change;
- It is both quantitative and qualitative: The process relies on the quantitative measurement of key cultural dimensions as well as qualitative methods, including stories, incidents and symbols that represent the immeasurable ambience of the organisation;
- It is manageable: The process of diagnosis and change can be undertaken and implemented by a team within the organisation—usually the management team—so that outside culture experts or change consultants are not required for successful implementation;
- It is valid: The framework on which the process is built is extensively supported by empirical literature and underlining dimensions that have a verified scholarly foundation;
- It makes sense to people as they consider culture assessment of their own organisation (Cameron & Quinn, 2006, pp. 19-20).

Alternative leadership orientation models such as the organisational culture inventory (Cooke & Rousseau, 1988) and the model of Hofstede *et al.* (2001) have been found to be far more complex in terms of the number of items and adequacy in capturing the domain and dimensions related to SISP processes. Hence, CVF focuses on values as core constituents of organisational culture.

The CVF was initially developed from research conducted on the major indicators of effective organisations based on two dimensions: (1) flexibility and discretion versus stability and control and (2) the second is external focus and differentiation versus internal focus and integration. In the first case, organisational change underlines flexibility, discretion and dynamism, while organisational stability focuses on control, sustainability and systematic performance. However, internal focus underlines integration, unity and maintenance of the socio-technical systems (Iivari & Huisman, 2007), whereas an external focus emphasises rivalry and interaction with the external environment. Together, these two dimensions form four clusters, each representing a distinct set of organisational effectiveness indicators. The opposite ends of these dimensions impose competing and conflicting demands on the organisation (Cameron & Quinn, 2006). The four types of core leadership value and orientation are as follows. The *collaborative leadership orientation* (flexibility and discretion vs. internal focus and integration) is primarily concerned with human relations and flexibility. Commitment, communication and development are its core value drivers. Effectiveness criteria include the development of human potential and participation. The *creative leadership orientation* (flexibility and discretion vs. external focus and differentiation) is entrepreneur transformation and vision value driven. The effectiveness criteria emphasise growth, resource acquisition, vision and adaptation to the external environment. The *competing leadership orientation* (stability and control vs. external focus and differentiation) is the hard driver, namely competitor value driven by goal achievement and profitability. The effectiveness criteria emphasise aggressive competition and customer focus. The *controlling leadership orientation* (stability and control vs. internal focus and integration) is geared toward coordinating, monitoring and organising. It emphasises control, stability and efficiency through the following regulations: It is value driven by efficiency, timeliness, consistency and uniformity. The effectiveness criteria emphasise control and efficiency with capable processes.

The highest performing leaders are those who have developed capabilities and skills that allow them to succeed in each of these four quadrants (Denison, 1995). They are self-contradictory leaders in the sense that they can be simultaneously hard and soft, entrepreneurial and controlled. Managerial effectiveness, as well as organisational effectiveness, is inherently tied to inconsistent characteristics (Cameron & Quinn, 2006, p. 47). Recognising the leadership typology, this research applies the CVF of leadership to assess organisations' top management responsible for planning information systems (mainly CIOs and CEOs). The aim of this to identify their leadership orientation and its effect on the behaviour of SISP processes and eventually SISP success. Leadership constructs and their measurement items are shown in Table (26).

Table 26: Leadership orientation constructs measurements.	
Leadership Orientation	

	Cameron & Quinn, 2006	Prior Validation
Collaborate	☑	☑
Creative	☑	☑
Controlling	☑	☑
Competing	☑	☑

Dimensions	**Indicators**
Collaborate	Our organisation is a very personal place. It is like an extended family. People seem to share a lot of themselves. Our leadership in the organisation is generally considered to exemplify mentoring, facilitating, or nurturing Our management style in the organisation is characterized by teamwork, consensus and participation. Our organisation emphasizes human development. High trust, openness and participation persist. The glues that hold our organisation together are loyalty and mutual trust. Commitment to this organisation runs high. Our organisation defines success on the basis of the development of human resources, teamwork, employee commitment and concern for people.
Creative	Our organisation defines success on the basis of having the most unique or newest products. It is a product leader and innovator. Our organisation emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued. The glue that holds our organisation together is commitment to innovation and development. There is an emphasis on being on the cutting edge. Our management style in the organisation is characterized by individual risk taking, innovation, freedom and uniqueness. Our leadership in the organisation is generally considered to exemplify entrepreneurship, innovation or risk taking. Our organisation is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.
Controlling	Our organisation defines success on the basis of efficiency. Dependable delivery, smooth scheduling and low-cost production are critical. Our organisation emphasizes performance and stability. Efficiency, control and smooth operations are important. Our management style in the organisation is characterized by security of employment, conformity, predictability and stability in relationships. Our leadership in the organisation is generally considered to exemplify coordinating, organizing or smooth-running efficiency. Our organisation is a very controlled and structured place. Formal procedures generally govern what people do.
Competing	Our organisation defines success on the basis of winning in the marketplace and outpacing the competition. Competitive market leadership is the key. Our organisation emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant. The glue that holds our organisation together is the emphasis on achievement and goal accomplishment. Our management style in the organisation is characterized by hard-driving competitiveness, high demands and achievement. Our leadership in the organisation is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus. Our organisation is very results-oriented. A major concern is getting the job done. People are very competitive and very achievement-oriented.

4.13.2.6 Organisational environment

The organisational environment can be assessed by different measurements; most of these are found in organisation and business study literature. In the SISP literature, most researchers have adopted and validated the environmental uncertainty construct as a measure for an organisational environment engaged in SISP (Newkirka & Lederer, 2006; Bechor *et al.,* 2009). Environmental uncertainty represents the difference between the amount of information available and information needed to perform a certain task within an organisation (Galbraith, 1977). In the context of SISP, environmental uncertainty is thought to represent the variation in information between business environment uncertainty and information needed when proceeding IS plans (Sambamurthy *et al.,* 1994). Environmental uncertainty has been described in terms of three dimensions (Newkirka & Lederer, 2006): dynamism, heterogeneity and hostility. These were extensively assessed and validated by their creators (Miller, 1983). Furthermore, IS researchers have used them in studies of the contextual factors that facilitate strategic IS applications, as well as on the integration of IS and business planning (Newkirka & Lederer, 2006).

Dynamism is the rate and unpredictability of environmental change. This is especially challenging to managers. Researchers have measured it in terms of the rate of product/service obsolescence, the rate of product/service technology change, unpredictability of competitors' moves and unpredictability of product/service demand changes. *Heterogeneity* is the complexity and diversity of external factors. It has been operationalised in terms of diversity in customers' buying habits, diversity in the nature of competition and diversity in product lines. *Hostility* involves both the availability of resources and the degree of competition in the external environment. Researchers have measured it in terms of the threats posed by labour and material scarcity, price and product-quality competition and product differentiation. All of these dimensions potentially affect SISP processes, thereby having an impact on SISP output.

The changeability and unpredictability of dynamism can make it a complex process for managers to achieve the required SISP output when they plan for information systems, since the business requirements and technologies may have unpredictably changed by the time the systems are implemented. The customer, competitor and product line diversity (of heterogeneity) can make it a complex process for managers to achieve the required SISP output because the SISP process demands information about and understanding of customers, competitors and product lines, and this might not fully extracted and embedded in the SISP process mechanism. The scarcity and competition of hostility can make it a complex process for managers to achieve the required SISP output because scarcity and competition involve a lack of information about labour, materials and competition, making allocation decisions for new systems more complex. Most of the theoretical interest and empirical studies have focused on the dynamism dimension rather than heterogeneity or hostility (Salmela *et al.,* 2000).

A recent study by Lederer (2006) on the environmental impact on SISP found that more extensive strategy formulation promotes more SISP success in an uncertain environment. Environmental uncertainty sub-constructs can be measured in a questionnaire using the evaluation of specific items defined previously by Teo and King (1997) and validated by Lederer (2006); the three dominions of environment uncertainly were employed in this study.

Table 27: Orgconstructsal environment construct measurements.					
Organisational Environment					
	Teo and King, (1997)	**Miller (1983)**	**Lederer, (2006)**	**Bechor et al (2009)**	**Prior Validation**
Dynamism	☑	☑	☑	☑	☑
Heterogeneity	☑	☑	☑	☑	☑
Hostility	☑	☑	☑	☑	☑
Dimensions	**Indicators**				
Dynamism	The product/services technologies in our industry change very quickly We can predict what our competitors are going to do next We can predict when our products/services demand changes Products and services in our industry become obsolete very quickly				
Heterogeneity	In our industry, there is considerable diversity in: product lines In our industry, there is considerable diversity in: nature of competition In our industry, there is considerable diversity in: customer buying habits				
Hostility	The survival of this organisation is currently threatened by: tough competition in product/service The survival of this organisation is currently threatened by: tough competition in product/service quality The survival of this organisation is currently threatened by: tough price competition				

4.14 The research model and hypotheses

From the above discussion and in light of the contingency theory of information systems, a model and full research hypotheses will be drawn to represent the directional effects and relationships among the research constructs (more discussion on the conceptual model are represented in the methodology chapter). Figure (33) presents the main hypotheses of this research.

- **Main hypotheses**

H1: The SISP context has a direct effect on perceived SISP success.

H2: The SISP context has a direct effect on perceived SISP process.

H3: The fit between the SISP context and SISP process has a direct effect on perceived SISP success.

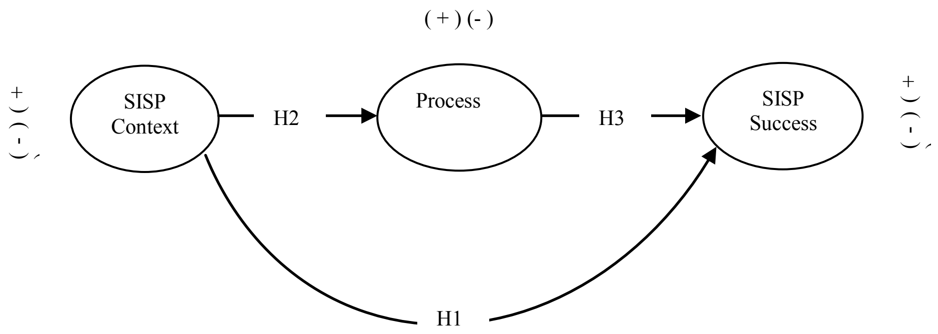


Figure 33: The main hypothesis

- **Composite hypothesis**

As mentioned before in the model specification section, an independent variable—also called a situational or contingent variable—in the SISP context affects a dependent variable or criterion variable of SISP success through one or more potential predictor variables, or mediators, of the SISP process (Preacher & Hayes, 2008). Figure (34) presents the composite hypothesis of the research model, where SISP success is used as criterion construct to establish a full model hypothesis. In the composite hypotheses model, there is a single direct effect of organisational context that positively or negatively influences SISP success, and multiple direct effects from the SISP context to each of the SISP process as composite mediators. Finally each single mediator has a direct effect on SISP success.

- **The direct impact of SISP context on SISP success**

The SISP context is a mixed factor in organisational context where combinations of organisational context create the SISP context (Grover, 2005). According to this definition of SISP context, the present research has specified the SISP context construct as a second order formative construct; the four contingent constructs developed from the theory are the dimensions that create the actual SISP context construct (MacKenzie *et al.*, 2005). This means that the measures cause the construct and that the construct is fully derived by its measurement; moreover, the measurement error (disturbance) is at the construct level, meaning that part of the construct is not explained by the measures. The achievement of SISP success under different organisational contexts is critical to planners, and the impact of organisational context is expected to directly influence the planning success. As SISP success is measured by the fulfilment of key objectives and improvements in planning capability (Segars & Grover, 1998; Tamir *et al.,* 2010), such an objective and capability of the IS plan could be subject to change in the organisational context, and usually the change in the organisational context would be followed by the development of plans that are less vulnerable to consequences of such change. This would also result in improvement in top management commitment and better implementable planning outcomes (Basu *et al.,* 2002).

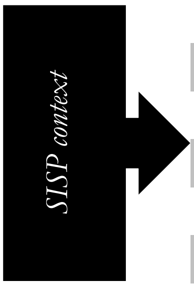
As mentioned above, Sambamurthy and Zmud (1995) established that organisational context has an influence over the IS plan outcomes quality. Nevertheless, Segars and Grover (1999) established a relationship between the planning approaches used in SISP and the effectiveness of the plan, carried out to suggest that this ought to be examined further in relation to the organisational context (Segars & Grover, 2005).

H1: SISP context has direct positive or negative effect on perceived SISP success.

The direct impact of SISP context of SISP process

SISP context affects the formulation of the IS planning process (Grover, 2005). SISP should be considered within the organisational context for possible leveraging of the cognitive capabilities of decision makers (Palanisamy, 2005). Newkirka (2007) suggested that an SISP process incorporating exhaustiveness and inclusiveness would be very effective in changing the SISP context (Newkirka , 2007). The seven SISP process approaches in this study were modelled to test the effect of SISP context on each approach, and to determine which approach is used most often by Libyan organisations, as well as how that approach is affected by the SISP context.

H2: SISP context has a direct effect on perceived SISP process



H No's	SISP process dimension name	The effect nature	
		+	-
H2a	*SISP process Flow*	*Top–down*	*Bottom–up*
H2b	*SISP process Formalization*	*Formal*	*Informal*
H2c	*SISP process Comprehensiveness*	*Comprehensive*	*Limited*
H2d	*SISP process Focus*	*Control*	*Innovation*
H2e	*SISP process Participation*	*Broad*	*Narrow*
H2f	*SISP process Consistency*	*High*	*Low*
H2g	*SISP process Intuition*	*High*	*Low*

The indirect impact of SISP context on SISP success through the fit between the SISP context and SISP process

Various researchers have suggested a theory-based model for the appropriate implementation of IS under changing organisational contexts (Sousa & Voss, 2008). In this research, and as mentioned earlier, the causality of the relationship has emerged from the contingency theory of information systems. There is a strong evidence in the SISP literature to support such causality; for example, Sambamurthy and Zmud (1995) established that organisational context has an influence on the IS outcomes plan quality. Nevertheless, Segars and Grover (1999) established a relationship between the planning approaches used in SISP and the effectiveness of the plan. They suggested that this ought to be examined further within the context of an organisation (Segars & Grover, 2005). Newkirka (2007) argued that an SISP process incorporating exhaustiveness and inclusiveness would be more effective in such an environment (Newkirka , 2007), whereas Segars and Grover (2005) suggested that as the planning process more rational, the chance of SISP success will increase. Based on the above suggestions and in line with the research investigation objectives, these hypotheses examine the mediation 'fit' modelamong SISP context and SISP success through the SISP process. The hypotheses are essential to answering questions about what SISP approach is used by Libyan organisations and how this affects SISP success, as well as what SISP contexts affect such processes and success.

The indirect impact of SISP context on SISP success through the fit between the SISP Context and SISP process

Various researchers have suggested theory-based model proposing for apt implementations of IS under changing organisational contexts (Sousa & Voss, 2008). In this research and as mentioned earlier the causality of relationship has emerged from the contingency theory of information systems, there is a strong SISP literature review support such causality, for example Sambamurthy & Zmud (1995) established that organisational context has an influence over the IS outcomes plans quality. Nevertheless, Segars & Grover (1999) established a relationship between the planning approaches used in SISP and the effectiveness of the plan, Segars & Grover carried out to suggest that this ought to be examined further within the context of an organisation (Segars & Grover, 2005). Newkirka a , (2007) suggested that SISP process incorporates exhaustiveness and inclusiveness would be more effective in such an environment (Newkirka a , 2007), whereas Segars & Grover (2005) suggested that as more rational the planning process has become the more chance SISP success will increase. Based on the above suggesting and in line with the research investigation objectives, these hypotheses examine the mediation "fit" model among SISP context and SISP success through the SISP process. These hypotheses are essential to answer questions about what SISP approach is used by Libyan organisation and how that impact on SISP success, also what SISP context effect such process and success.

SISP Context →

SISP process dimension name	*The effect nature*		H No's
	+	-	
SISP process Flow	*Top–down*	*Bottom–up*	**H3a**
SISP process Formalization	*Formal*	*Informal*	**H3b**
SISP process Comprehensiveness	*Comprehensive*	*Limited*	**H3c**
SISP process Focus	*Control*	*Innovation*	**H3d**
SISP process Participation	*Broad*	*Narrow*	**H3e**
SISP process Consistency	*High*	*Low*	**H3f**
SISP process Intuition	*High*	*Low*	**H3g**

→ SISP Success (+ / −)

H3: The fit between the SISP contexts and SISP process has positive or negative effect on perceived SISP success

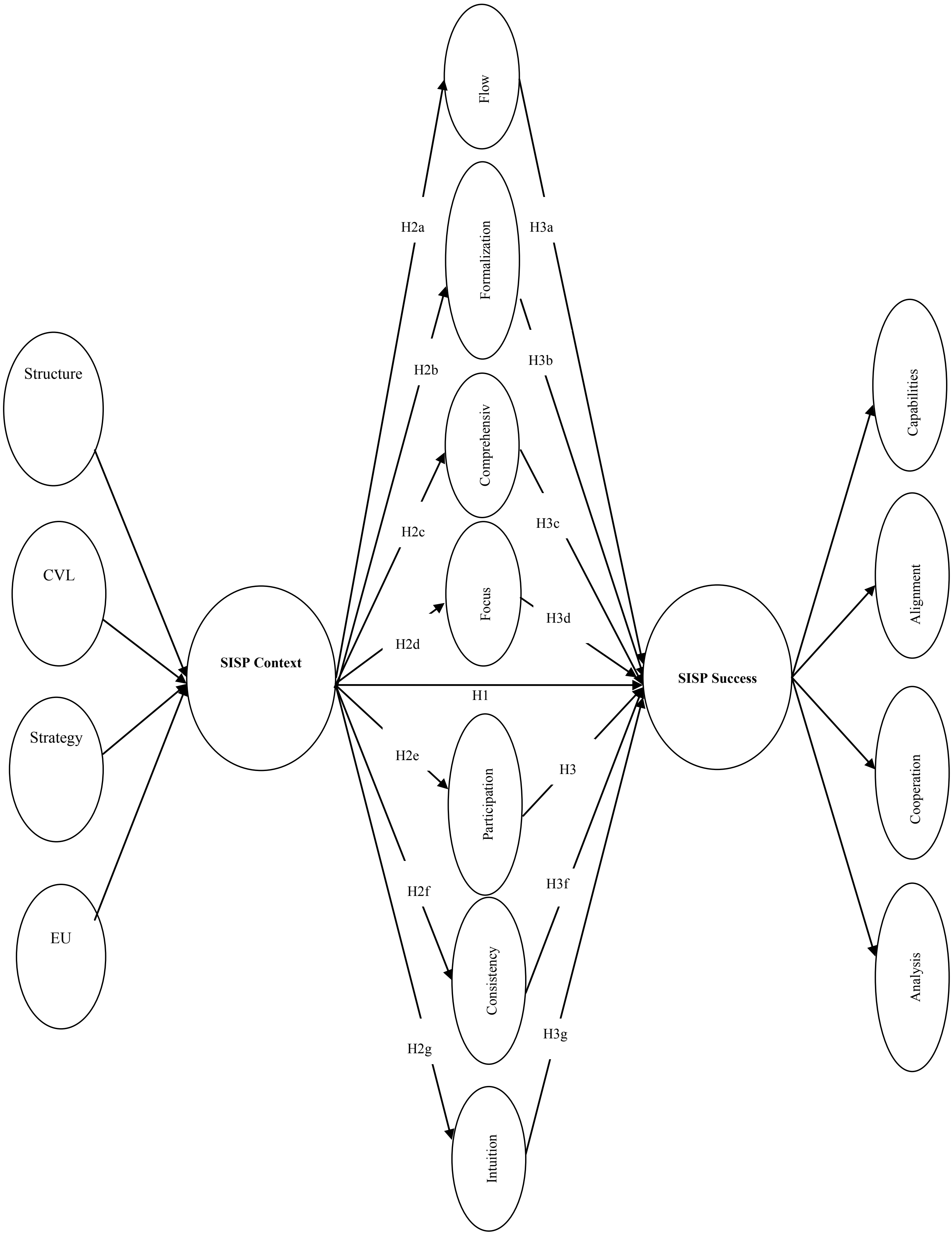


Figure 34: Composite Conceptual Model.

4.15 Chapter four summary

The discussion on the operationalisation of the research constructs that originally emerged from the contingency theory of information systems has succeeded in identifying measurement items for each construct. These measurements will be deployed in a survey instrument. The constructs developed in this study were SISP success, SISP context and SISP process, all of which are multidimensional, multi-items constructs. The SISP success construct includes four dimensions and the organisational context construct includes four dimensions, while some dimensions are second-order dimensions. Finally, the SISP process construct provides a holistic approach to capture and reflect on decision-making behaviour in planning for information systems. As discussed above, the overall nature of SISP process in this study includes three main stages—the rational stage, adoptive stage and intuition—characterised by the degree of rationality in decision making, which is influenced by the organisational context, and the approach adopted by managers to effect the planning success of information systems.

The author argued that there is a sequence in the decision-making process mechanism that starts with the intuition and should evolve as the organisation evolves to be more adaptive to the business environment. A change in the organisational context may leverage the level of rationality in the decision-making process; this would demonstrate the degree of focus on producing efficient planning and demonstrate a clearer method of planning based on past recorded organisational knowledge and blueprint documentation. In addition, this will allow the organisation to be more comprehensive in planning and provide different part of organisation means of cooperating more effectively to produce rational plan. This can occur when the participants in the planning process demonstrate understanding of the organisational context and the need for information systems. The items used in measuring the SISP process construct are all grounded in prior SISP research; however, the items that measure 'intuition' were adopted from strategic management research. Therefore, the SISP process construct is a multidimensional, multi-items construct; all seven constructs will be included in the survey instrument.

Chapter Five: Data Collection and Analysis

5 Introduction

This chapter will discuss and report on the empirical findings from the collected data. This will follow the methodology developed in the methodology chapter. Here, the reporting will include two sections: The first section will discuss the refinement of the instrument, data collection and sample characteristics; the second section will report on the statistical measurement and structural model. This chapter focuses on analysis of the collected data, putting them in a structural format to make the scientific inquiry explicit, such that they can be easily interpreted into logical information. The quantitative data will be structured in the form of SEM, where the fit between the data in models will explain the relationship among different constructs and variables to be able to interpret the model fit and explain the hypotheses in a quantitative way.

5.1 Instrument refinement and sample characteristics

5.1.1 Instrument validity

This section focuses on the instrument validity and pilot study results, following the instrument development methodology (IDM) developed earlier in the SEM statistical methodology section, starting with the pre-test procedure, piloting and finally the item screening procedure. The purpose of these procedures is to purify the instrument and act as a first step in the validation of the items used to measure the constructs under investigation in Libyan organisations. These steps have been carefully designed and constructed from leading research methodology publications in the field of MIS in general and SISP studies in particular. The procedures contain three sequential steps: the pre-test, pilot test and item screening. These test the initial whole set of constructs and their items.

5.1.1.1 Pre-test

The feedback from the pre-test procedure is divided into two sections characterised by the procedure objectives: The first is to obtain feedback on the instrument layout and ease of understanding, while the second is to obtain feedback on how relevant the items are to the constructs under investigation.

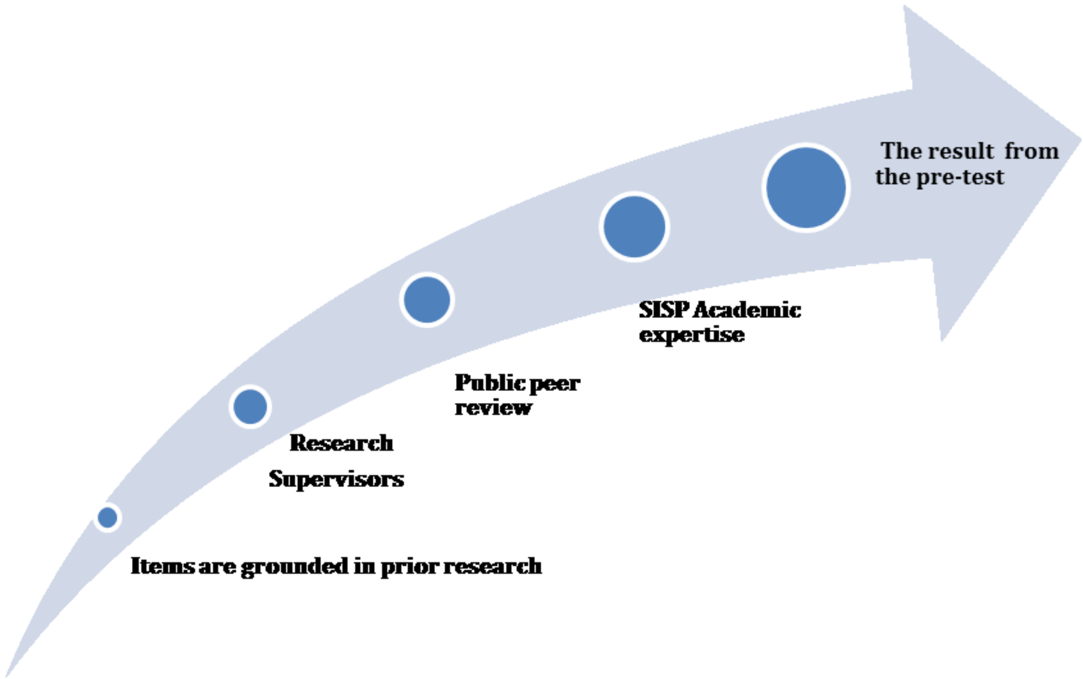


Figure 35: Pre-test steps in instrument validity

➢ **First objective: instrument layout and ease of understanding**

The first three stages in Figure (35) are implemented to meet this objective, and feedback should be collected regarding the survey layout and ease of understanding.

- **Items were grounded in prior research**

This stage is discussed in detail in the operationalisation of the research constructs chapter, where careful prior measurement items were selected for the constructs under investigation; these measurement items were selected from the field of MIS and the reference disciplines of strategy and organisation theory.

- **Research supervisor's review**

Dr Ibrahim Elbeltagi at Plymouth Business School supervised the study; the feedback received from this review was contributed to the adjustment and refinement of the instrument layout and clarity of the measurement items.

- **Public peer review**

The author put the survey forward for review by individuals thought to be able to positively contribute to the refinement of the instrument design. Feedback was collected from a PhD student and international academics, including individuals from both the UK and Libya. The author attended conferences related to SISP (presenting a paper in a UKAIS at Oxford University, where Professor Bob Galliers and Dr David Wainwright were on the reviewing committee), as well as maintaining affiliations with the Association of Information Systems and the British Computer Society. The responses collected on the survey instrument were very useful in the refinement process.

- **Second objective: items relevant to the constructs under investigation**

At this stage, the survey instrument was directed to IS academic and practitioner experts to evaluate how relevant the measurement items were to the construct under investigation.

- **Feedback from SISP academic experts**

Following the IDM, as shown in the methodology chapter and as suggested by Malhotra and Grover (1998) and Venkatraman and Grant (1986), the research constructs were subjected to review by a panel of experts familiar with the research domain. In this stage, a document of around 30 pages outlining the research design and the constructs with their measurement items and references was sent to a panel of nine academic experts for their feedback and suggestions; after the invitation letter was sent to the panel, three out of nine were happy for receive the document, and only Prof. Albert L. Lederer and Prof. Joe Peppard responded once the document had been received. The most in-depth feedback was received from Prof. Lederer, who is one of the founders of the SISP research domain. The feedback from the panel can be summarised as follows:

- Wording changes were recommended (for example, omitting the phrase 'SISP phenomenon').
- Comments about the number of items were expressed; it was suggested that the length of the instrument might deter managers from completing the questionnaire. It should be borne in mind that the panel was sent all measurement items before the pilot test and item screening.
- Comments and suggestions on the research design—in terms of the reliance on a questionnaire to obtain data—were expressed.
- Suggestions for rewording the research question (from 'How successful is SISP in Libyan organisations?' to 'What leads to successful SISP in the context of Libyan Organisations?'). The suggestion made the second question more consistent with the research design, such that it will be much more valuable.

Feedback from SISP experts was very beneficial to the instrument development process; many comments were taken into consideration and adjustment made to improve the overall instrument clarity and validity. Moreover, the comments received from the panel boosted the author's confidence in the research and ensured that the results of the study will be of value to the research domain and the organisations under investigation.

5.1.1.2 Pilot test

Subsequent to the review of the pre-test, a pilot test was conducted to further appraise and purify the instrument. In this study, two pilots were conducted. The first was developed earlier in this research; its aim was more exploratory and procedure confirming. Twenty-four surveys were sent to identify sites, and 19 were returned; however, large parts of the questionnaire were not completed. This pilot was conducted purely online by sending emails and links to the survey website; no follow-up was attempted. The quality of the data collected in this pilot was unsatisfactory, as there was a lot of missing data. This forced us to rethink the procedure to encourage participants to put more effort into filling out the survey. It also prompted us to reconsider the length and the design of the survey; nevertheless, the pilot was beneficial in helping to develop more robust procedure, as well as contributing to the validity of the wording and translation.

In the second pilot, action plans were considered on the basis of the results the first pilot; therefore, a more tactical procedure was adopted. There was great interest in our study, as shown in the response rate of 79% from the first pilot. Still, it was necessary to improve the survey design and procedure. Steps were taken to improve the survey procedure in the second pilot, including mixed mode data collection, extra validation of the translated survey and a more personal approach in reaching out the participants. In this survey, a random sample of 50 potential respondents were contacted; 30 of these responded, exhibiting a response rate of 60% and better quality data as well as more validation of the survey contents. We improved the initial survey by adding the possible response of NA (not applicable) to the items; this procedure was incorporated into the main survey (see research methodology). In the main survey, we also adopted a 5-point Likert scale rather than 7-point Likert scale as step to improve the construct reliability. The final result from the pilot test was reviewed and adjustments were made as appropriate to the instrument. The most significant improvements in the second pilot study were refining the survey procedure, adding more content and improving wording validity. Furthermore, after carrying out the initial statistical analysis from the data gathered from the 30 respondents, particularly those concerned with the construct reliability through 'alpha analysis', some of the items were dropped due to their lack of consistency.

5.1.1.3 Item screening

As mentioned in the methodology section, the rationale of the item screening step is to empirically screen the items on the instrument by employing the quantitative procedure developed by Lawshe (1975), which determines whether each item on the instrument satisfactorily represents the content domain of the construct under investigation in Libyan organisations. The targeted participants in this stage where IS practitioners with experience in IT/IS; usually, they had vast knowledge of IS and its application within an organisation. At this stage, IS practitioners from Libyan organisations were asked to provide feedback on the relevance of the items used in the survey to capture and measure the construct dimensions under investigation. In total, 10 IS practitioners responded. Three were IT directors in large banks in Libya; two were private IT consultants involved in large private and public sector projects and had recently executed large IT projects at the 7th-of-April University, Tripoli Central Hospital and 'Libya Oil', the oil production and distribution company; and five were IT directors working in official government departments. All of them were asked to fill out the initial survey and give their feedback on how relevant the measurement items are to Libyan organisations. After collecting their feedback, a telephone conversation was held with each one to obtain more in-depth understanding of their comments related to the current IS practice in Libya. The feedback from IS practitioners significantly affected the survey instrument measurement items; some items were dropped as a result of this feedback.

Table 28: Statistical significanLawshecontent validity, Lawshe (1975).

Minimum Values of CVR and CVR_t One Tailed Test, p= .05	
No. of Panelists	Min Value
5	0.99
6	0.99
7	0.99
8	0.75
9	0.78
10	0.62
11	0.59
12	0.56
13	0.54
14	0.51
15	0.49
20	0.42

The panellists were sent a list of the items from the updated instrument and asked to evaluate their relevance to the constructs on a three-point scale:

1= Not Relevant, 2= Important (But Not Essential), 3= Essential.

From these data, a content validity ratio (CVR) was calculated for each item according to the following formula:

$$CVR = (n - \frac{N}{2})/(\frac{N}{2})$$

Where N is the total number of respondents and n is the frequency add up of the number of panellists rating the item as appropriate, either 3= Essential OR 2= Important (But Not Essential). After CVR was calculated, each item was evaluated for statistical significance using the table published by Lawshe (1975). Statistical significance implies some level of content validity for the item, whereas statistical non-significance indicates an unacceptable level of content validity. Two examples can be taken from the data collected. In the first example, there were 10 respondents, seven of whom answered 'Not Relevant', two answered 'Important (But Not Essential)' and just one answered 'Essential'. In this case, Lawshe's calculation with a target value of minimum 0.62 to accept the item would be as follows:

$$CVR = (n - \frac{N}{2})/(\frac{N}{2}) \qquad \textit{Where} \quad N = 10 \quad n = 3$$

$$CVR = (3 - \frac{10}{2})/(\frac{10}{2}) \qquad CVR = 0.4$$

Item Code	Item Name		
al8	Assessing the strategic importance of emerging technologies		
Item Measurement			
Scale	Not Relevant	Important (But Not Essential)	Essential
Result	7	2	1

The CVR for this item is 0.4, with targeted CVR of above 0.62; therefore, this item will be dropped due its irrelevant to the sample population under investigation. In the second example, we have the same 10 respondents, one of whom answered 'Not Relevant', three of whom answered 'Important but not essential' and six answered 'Essential'.

Item Code	Item Name		
pi1	Relying on personal judgment when planning for Information Systems		
Item Measurement			
Scale	Not Relevant	Important (But Not Essential)	Essential
Result	1	3	6

In this case Lawshe calculation with target value of minimum 0.62 to accept the item will be as following. $CVR = (n - \frac{N}{2})/(\frac{N}{2})$ Where $N = 10 \quad n = 3$

$$CVR = (9 - \frac{10}{2})/(\frac{10}{2}) \qquad CVR = 0.8$$

The CVR for this item is 0.8, with targeted CVR of above 0.62, therefore the item will be kept due its relevant to the sample population under investigation. Although this method helps in evaluate the relevant of the items to the population under investigation, nevertheless there is a statistic sensitivity disadvantage of this method when using it with a smaller sample, for example when we have $n = 8$ and therefore $CVR = 0.6$, this result suggests a content validity ratio below the minimum, although in this case the 'Not Relevant' scale scores only 2, and both the

'Essential' and 'Important (But Not Essential)' scores 8. In normal circumstances, the method suggests that the item should be dropped. Therefore, the author has been very careful in assessing the content validity of this method by relating the item to other methods in our refinement of the instrument, such as the item α (alpha) resulting from the pilot tests (the full list of dropped items is given in Appendix 1).

5.1.2 Main survey procedure

The main survey was administered in four stages. The first stage was the invitation stage, where a personal approach adopted to contact potential respondents by telephone and email. This was done to build a sense of commitment toward participation in the research study and at the same time to confirm that the sample population was the target one for the study by asking basic questions derived from the sample population characteristics as described in the general methodology section. The objective here was to ensure that there a degree of SISP existed in the target sample. Four hundred potential respondents from different sectors and different company sizes in Libya were selected as the sample frame. In the second stage, the survey package was mailed, including a cover letter explaining the purpose of the survey and hard copy of the questionnaire, as well as a gift card and pen as incentives to fill out the survey. The third stage was to follow up the progress of survey completion and find out if the respondents encountered any problems in filling out the questionnaires. This was done mainly by telephone, as email proved to be an ineffective method in this case. This was the hardest stage of the process of data collection, incurring the most cost, effort and time consumption. The last stage was collecting the surveys. Some respondents completed the survey within two weeks and some were given extra two weeks; however to achieve the results that we were aiming for, this particular stage took more than two months to complete. When following up, the potential respondents were asked if they have completed the survey so that physical collection could be arranged, as we had encountered problems in collecting completed surveys due to the unreliable mail system in Libya. However, because this problem had emerged at an earlier stage, this was taken into account in the main survey. Only a small number of companies returned the questionnaire without being reminded. We distributed the survey in two rounds: In the first round, 38 cases out of a sample of 200 were received without a reminder, and in 25 cases we had to follow up; in the second, 31 cases out of a sample of 200 were received without reminder, and in 23 cases we had to follow up. Overall, 69 respondents replied early and 48 replied later.63 Cases.

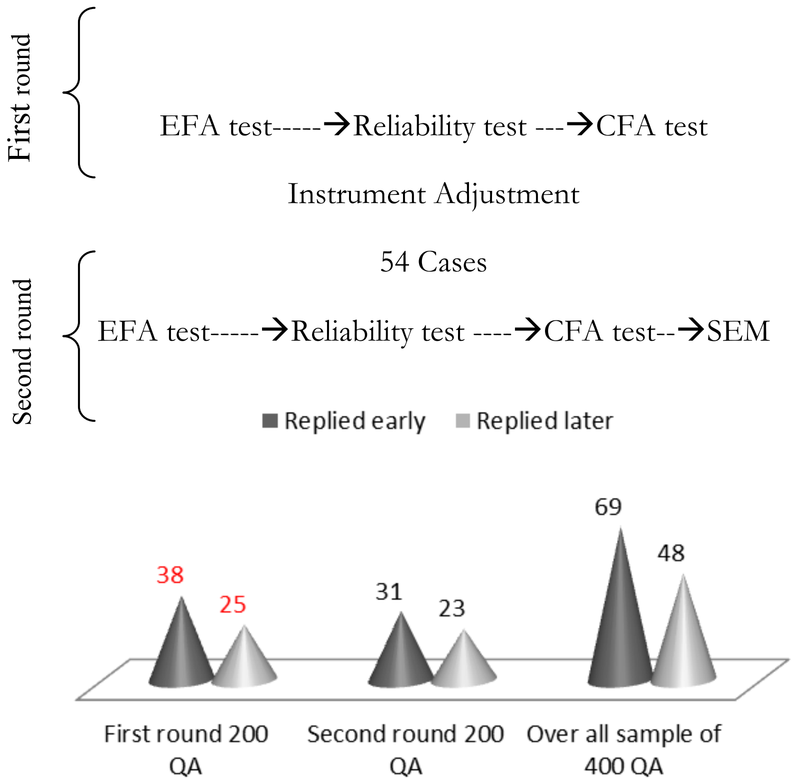


Figure 36: main survey protocol.

After the first administration, the instrument was improved by omitting items that were not valid through the procedure mentioned in the methodology chapter. The omission of items is justified in the factor analysis step with loadings below the established threshold or because an item loads on multiple factors. Likewise, items may be dropped to improve the reliability statistics. After the procedure is conducted and constructs are defined with their item loadings, these items are included in an updated edition of the measurement instrument and this new version is administered to a different random sample. Figure (36) shows the main instrument protocol and procedure.

The data from the second administration were combined with the data from the first administration and evaluated for EFA →Reliability →CFA. However, this time, SEM was deployed to measure the theoretical model.

5.1.3 Sample characteristics

In the methodology section (sampling with a multi-mediation effect and sample size), we have pointed out that in order to obtain an adequate sample size and quality response, eight aspects of sampling must be evaluated. The author divided these aspects into two sections as described below.

5.1.3.1 Sample size

In this study, we have aimed at a minimum of 115 completed surveys out of 400 distributed questionnaires (please refer to the sampling with a multi-mediation effect in the SEM methodology section). The sums of 400 potential respondents were identified from the sample population and frame described in the methodology section. A total of 126 completed questionnaires were collected, representing a 31% response rate; however, nine cases were completely excluded from the analysis because they were deficient. Therefore, the total number of cases included in the subsequent analysis was 117, representing a 29% response rate. In the methodology chapter, it was noted that there was no exact consensus on the adequate sample size, although there is a need to have as many cases as possible. A response rate of between 120 and 200 cases was anticipated. However, the response rate of 117 cases was just above the expected minimum of 115. Although it is considered that the sample size of 117 was below the 120–200 recommended responses, it was still within the recommended response rate of above 20%, and therefore satisfies the number of cases needed to carry out the SEM analysis (Denscomb, 2003; William, 1977; Hair *et al.*, 2010).

5.1.3.2 Missing data

The missing values of the collected cases are missing at random (MAR), where missing values are not randomly distributed across all observations but rather are randomly distributed within one or more sub-samples. The MLE method is a common method of imputation; it assumes that missing values are MAR. In the analysis with missing values, the author applied maximum likelihood estimation instead of relying on ad-hoc methods like listwise or pairwise deletion or mean imputation, which can introduce bias into the sample. Instead, AMOS 17 was employed, which can analyse data from several populations at once. It can also estimate means for exogenous variables and interceptors in the regression equations.

5.1.3.3 Calculating the significance of sample power using the T-test

One goal of the proposed study is to test the null hypothesis that the correlation in the population is 0.00. The criterion for significance (alpha) has been set at 0.050. The test is one-tailed, which means that only an effect in the expected direction will be interpreted. With the proposed sample size of 117, the study will have power of 95.9% to yield a statistically significant result. This computation assumes that the correlation in the population is 0.30. The observed value will be tested against a theoretical value (constant) of 0.00. This effect was selected as the smallest effect that would be important to detect, in the sense that any smaller effect would not be of clinical or substantive significance. It is also assumed that this effect size is reasonable, in the sense that an effect of this magnitude could be anticipated in this field of research.

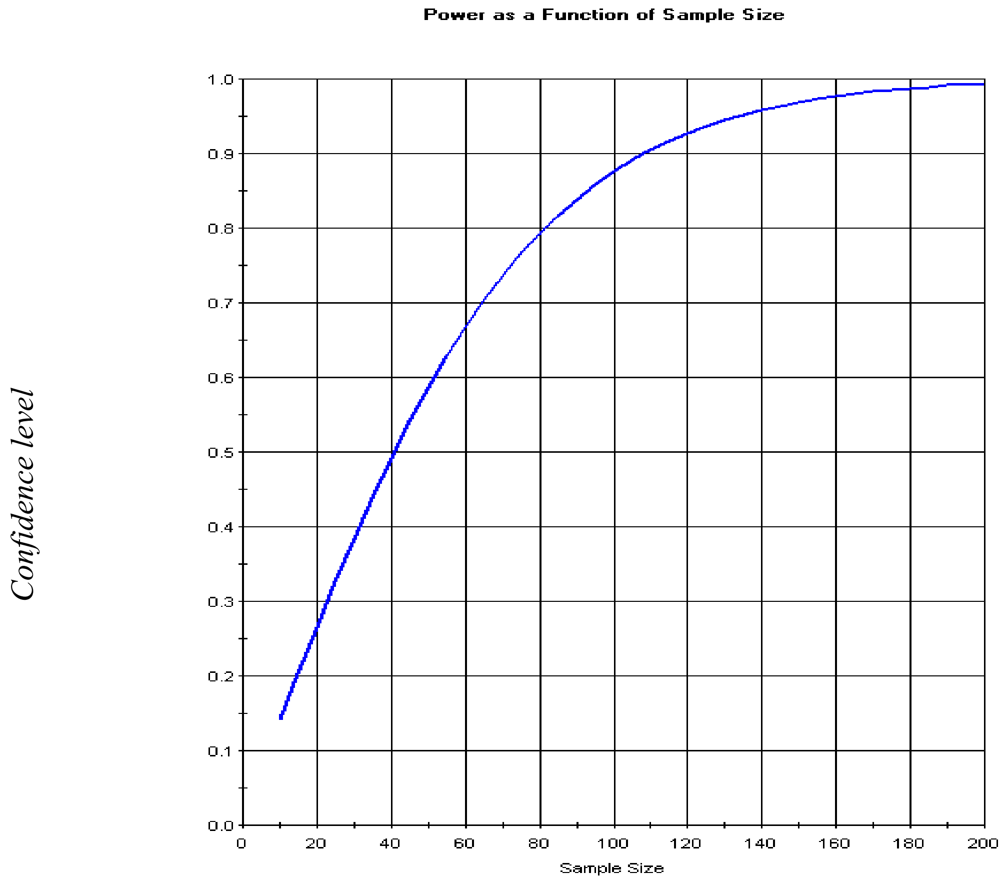


Figure 37: Sample power using the T-test

A second goal of this study is to estimate the correlation in the population. Based on the same parameters and assumptions, the study will enable us to report the value with an accuracy of approximately plus/minus 0.17 points (95.0% confidence level). For example, an observed correlation of 0.30 would be reported with a 95.0% confidence interval of 0.13 to 0.46. The accuracy estimated here will vary as a function of the observed correlation (as well as sample size), and in any single study will be narrower or wider than this estimate. In this analysis, we have used SPSS Sample Power 2.0 (power computation: Fisher Z approximation [when null=0, exact formula is used]; Accuracy computation: Fisher Z approximation).

5.1.3.4 Non-response bias

Non-respondents may answer survey questions differently than do respondents, and thus can bias survey research results. Non-response bias is investigated by comparing the industry distribution of the returned questionnaires to the population industry distribution using a chi-square one-sample test (Byrd & Turner, 2000). Here, we used SPSS to calculate the chi-square.

Table 29 : Chi-square one sample test.										
Chi-square one sample test										
			Organisation ownership & Purpose	Total years of experience in/with information systems	Approximate annual revenue of your organisation	Approximate Number of IS/IT Employees	Approximate total annual spending on IS/IT department and activities	Nature of your organisation business	IS department level of structure	Autonomy level of the IS department
Chi-Square			41.325[a]	65.009[b]	25.735[a]	34.821[c]	41.530[a]	33.923[d]	1.677E2	1.676E2
df			3	4	3	2	3	1	2	2
Asymp. Sig.			.000	.000	.000	.000	.000	.000	.000	.000
Monte Carlo Sig.	Sig.		.000[e]	.000[e]	.000[e]	.000[e]	.000[e]	.000[e]	.000[e]	.000[e]
	95% Confidence Interval	Lower Bound	.000	.000	.000	.000	.000	.000	.000	.000
		Upper Bound	.007	.007	.007	.007	.007	.007	.007	.007

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 29.3.
b. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 23.4.
c. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 39.0.
d. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 58.5.
e. Based on 400 sampled tables with starting seed 213798720.

In the computed chi-square statistic, testing the sample industry distribution against the population distribution, a statistically significant result is indicated by asymp. Significance values below 0.05. This suggests that the distribution of firms in the sample did not significantly differ from the distribution of firms in the population, thus indicating little or no non-response bias in this study**.** However, in every voluntary survey, some people may choose not to participate. These 'non-respondents' may have made this choice for many different reasons, some of which are related to survey design and others to cultural norms and expectations.

Lynn (2008) identifies several reasons for non-response: I) failure of the data collector to locate/identify the sample unit, II) failure to make contact with the sample unit, III) refusal of the sample unit to participate, IV) inability of the sample unit to participate (e.g. ill health, absence, etc.), V) inability of the data collection and sample unit to communicate (e.g. language barriers) and VI) accidental loss of the data/questionnaire. In our case, we refer to two main reasons to explain the non-response rate. These are the refusal sample unit to participate and inability of the sample unit to participate. At the same time, however, the respondents and non-respondents could be described according to the same phenomenon, specifically the changing business environment of the Libyan economy and the major reform that the country was witnessing when we were collecting data. Therefore, a culture of 'modernisation and information technology' has been witnessed, where major organisations in Libya were leading the change. Two major issues relate to this change. One is the adoption of the modernisation strategy and philosophy, and on the other hand the management and control of such change with all the new tools that come with it, including information technology. Perhaps the 'national identity card, e-government, modern banking systems and digitalisation of the political systems' are the major initiated projects on a countywide level; this may have been an extra motivation for the participants who completed the survey and a barrier for others who refused or were unable to complete the questionnaire. Non-response bias is listed as one of the four primary sources of survey error (Dillman, 2007), giving an indication of the importance of dealing with this bias when it does exist. Although there are statistical procedures that attempt to correct for non-response error, including weighting and imputation (Bethlehem, 2002; Lee, Rancourt, & Särndal, 2002), these are often complex and the best option is still reducing non-response bias at the outset (Bethlehem, 2002).

5.1.4 Common method variance

Common method variance (CMV) is a survey research problem where the individual subjects rate two or more constructs and are suspected of giving socially acceptable answers (Henry *et al.*, 2008). Although the CIO is typically viewed as the most knowledgeable person in an organisation to assess SISP (Premkumar & King, 1992), and most research thus uses a single subject to assess it (Raghunathan& Raghunathan, 1991; Lederer & Sethi, 1996; Segars *et al.,* 1998; Kunnathur & Shi, 2001; Lee & Pai, 2003; Lin, 2006), in this study we have incorporated a question asking the participants if they are directly involved in the formulation of SISP. If they answered YES, they were asked to answer the other questions; if they were not involved with the SISP formulation, they were excluded from the analysis. The different roles of those who confirmed their involvement in SISP are represented in Table (30).

Table 30: The frequency role of respondents.

Question	The role	Frequency
What is your position in the company?	Chief executive officer (CEO)	13
	General manager	10
	IS department manager	5
	Finance manager (CFO)	18
	Operational Manager	8
	Chief information officer (CIO)	28
	Branch manager	15
	Director of Administrative Affairs	20

This variety of roles found in the returned questionnaires shows that CIOs are not the only ones responsible for planning the IS in Libyan organisations; rather, other managers are also involved. This indicates that CMV does not exist in this study; however, to further confirm the absence of CMV, we looked at different methods to assess the CMV such as the traditional multi-trait multi-method (MTMM) procedure, the CFA-based MTMM technique, the marker-variable technique and Harman's single-factor test, which is arguably the most widely known approach for assessing CMV (Podsakoff *et al.,* 2003; Podsakoff & Organ, 1986).

The current study employed Harman's single-factor test to check for common method variance (Podsakoff & Organ, 1986). The test assumes that if a substantial amount of such variance exists in the data, a single factor will emerge from an exploratory factor analysis of all the variables and will account for most of the variance. However, the analysis in the current study identified 16 factors with an eigenvalue greater than one, with no single factor explaining most of the variance (i.e. they ranged from 1.057 to 42.3%). These results are consistent with the absence of common method variance. Nevertheless, socially desirable answers remain a possibility, and other managers might have more detailed knowledge about the constructs. Henry *et al.* (2008) suggested that the use of multiple respondents per organisation is always preferable.

5.1.5 Response sample characteristics

In the first section of the questionnaire, we asked demographic questions to determine the characteristics of the participants and their organisation. These questions differed in their importance and relevance to the current study. Perhaps the most important question whether the participant was directly involved in the formulation processes of SISP, with the following question: 'Are you directly involved in decision making regarding the formulation of information systems planning?'

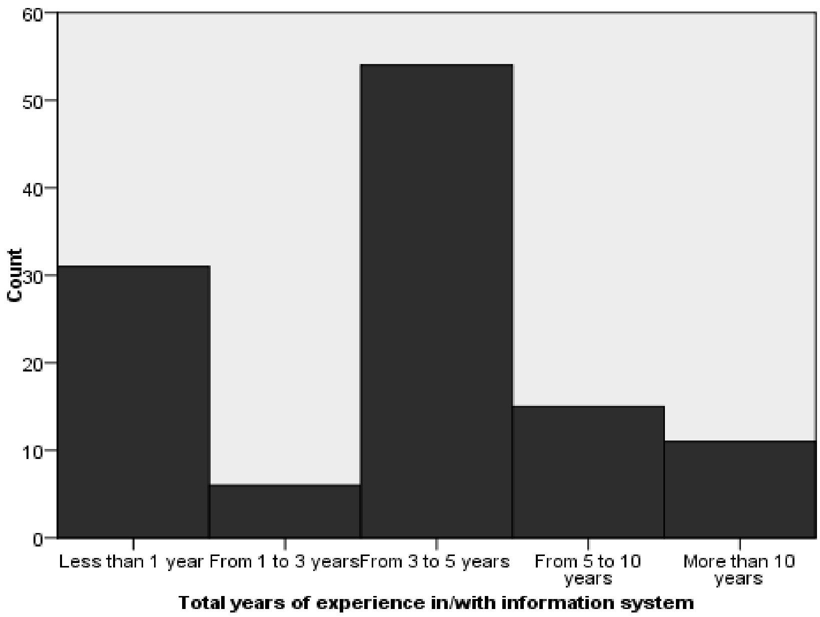


Figure 38: Response sample characteristic (1)

The answer to this question was designed to confirm that the people who answered the questionnaire were the most knowledgeable about SISP in their organisation; although we potentially targeted CEOs and CIOs, the people in these positions are not the only ones responsible for SISP in Libyan organisations. By investigating 'total years of experience in information systems', we discovered that more than 50 people who responsible for SISP had 3–5 years' experience with information systems and over 30 had only one year. There tended to be fewer people with more information systems experience. This indicates that the roles related to information systems in Libyan organisations are fairly young or that people who are responsible for SISP in Libyan organisations are not well experienced and lack exposure to the domain of information systems; this could affect the quality and outcome of SISP.

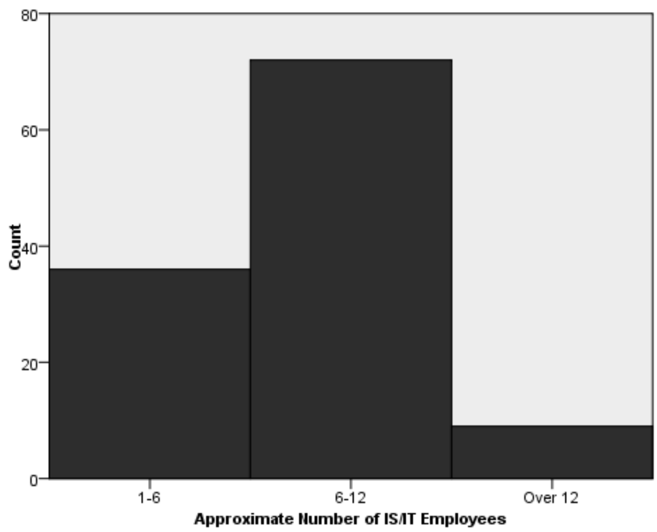


Figure 39: Response sample characteristic (2)

In this research, we set a criterion to target medium to large companies. This was based on company annual revenue, total number of IT employees and annual spending on the IT/IS department and activities. Figures (39) and (40) show that although the majority of the organisations in the sample have annual revenue of more than a million per annum, the annual spending on IT and the number of IT employees does not meet the expectation from the level of the organisation income: five organisations spent under $10,000, 79 organisations spent $10,000-100,000 and 30 organisations spent over $100,000 per annum on the IT department and activities. Furthermore, 38 organisations have 1–6 IT staff members, 75 organisations have 6–12 full-time IT staff members, and just seven organisations have over 12 IT/IS full-time IT employees.

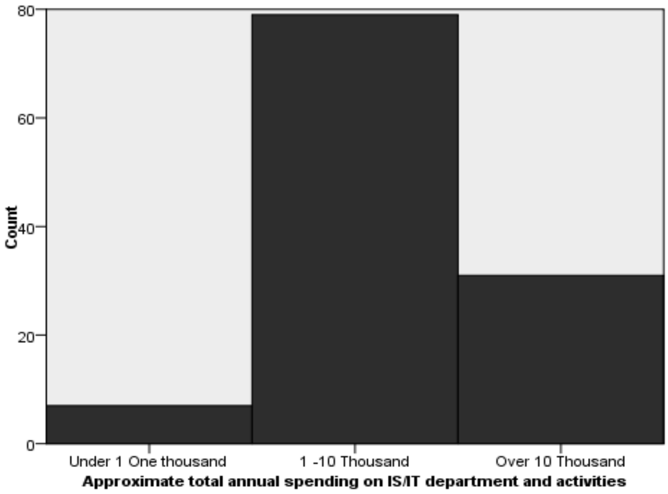


Figure 40: Response sample characteristic (3)

The data give the impression that not much attention is paid to IT/IS departments in Libyan organisations. If we compare the total number of IT/IS employees with the spending on IT/IS departments, this suggests that low wages of the IT/IS employees or static spending on IS applications are evident in the majority of the companies in Libya.

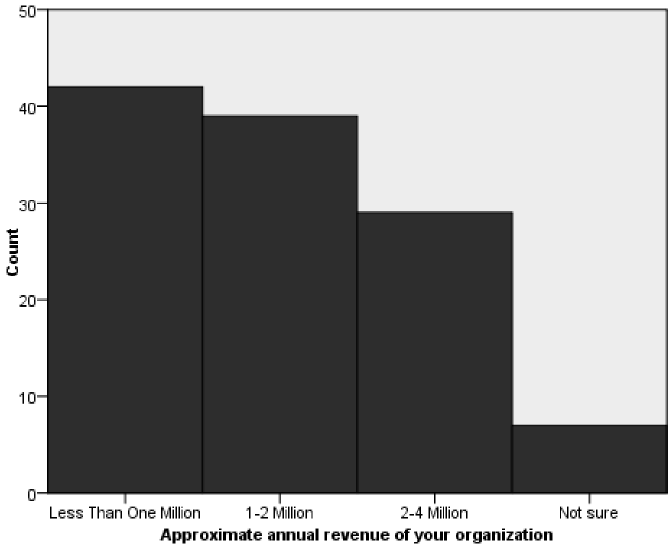


Figure 41: Response sample characteristic (4)

The sample has achieved level or representation both in commercial industries and commercial activities; however, there are more commercial activities. Although SISP can equally exist in both industry, this level of representations shows that there are more commercial activity organisations than commercial industry ones in the Libyan economy.

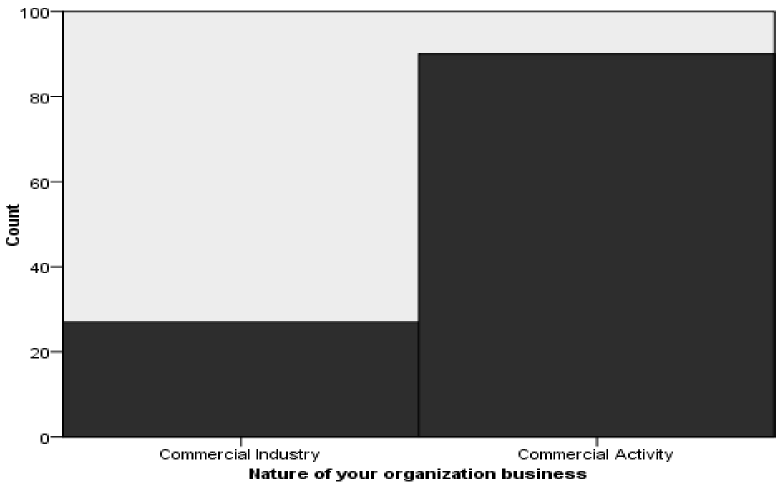


Figure 42: Response sample characteristic (5)

Turning our attention to the IS department structure and its location in the bigger picture of the organisation, we found that IS tend to be represented in the overall organisational structure, with more than 100 companies reporting an IS department has an office within the company structure; this information is needed to understand the level of autonomy of IS department in the organisation.

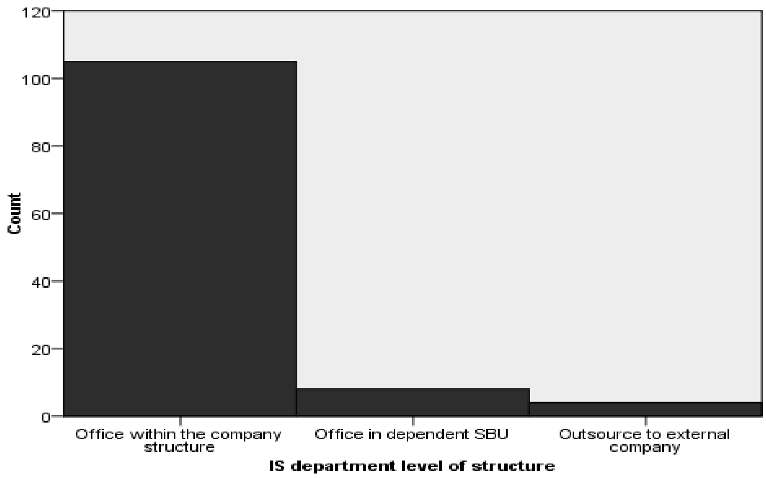


Figure 43: Response sample characteristic (6)

By linking the 'autonomy of the IS department' question with the 'IS department level of structure' question, one can suggest that the report to different departments and not directly reporting to the board or CEO is related to the IS department's level of structure. This leaves us to further suggest that the involvement of top managers in the IS department is limited or indirect, which could explain the lack of top management support of IS, eventually reducing the chance of the success in SISP (Grover, 2007).

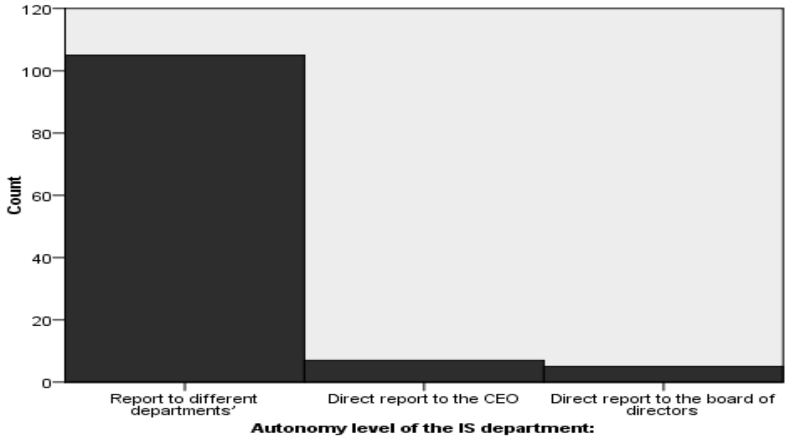


Figure 44: Response sample characteristic (7)

Last but not least, private and public organisations were represented, but the majority were companies from the public sector, specifically fully or partially government-owned profit and non-profit organisations. With this response rate from public organisations, it may be inferred that this sector has been exposed to change and is starting to take IS seriously, which perhaps was not the case a few years ago, when obtaining data from the public sector was a hard process if not totally impossible.

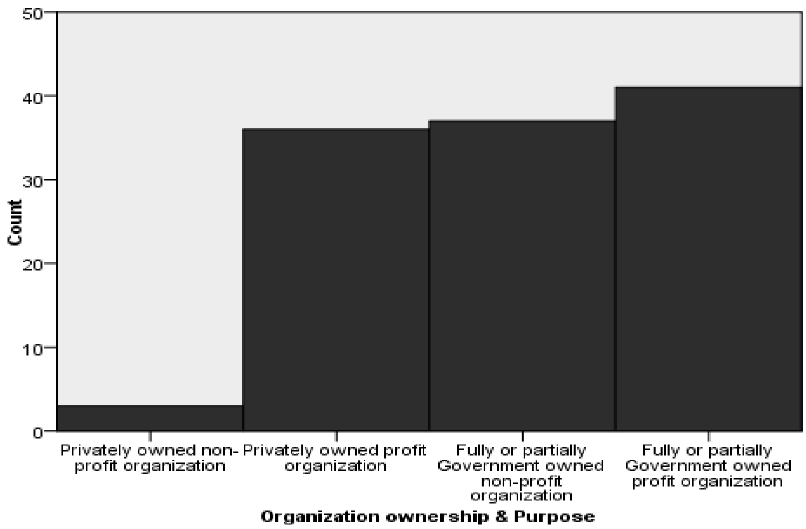


Figure 45: Response sample characteristic (8)

The private sector also responded reasonably positively, despite the culture of confidentiality and non-exposure to research studies that dominated both sectors. In this research, we believe that we have obtained a level of confidence in our data such that it represents the inside reality of SISP within Libyan organisations. However, this might be disputed due to the sample size; nevertheless, the level of sample representation (as discussed above) will allow us to yield significant results and generalise the findings in Libyan organisations.

5.2 Measurement models and the structural model

After the data were collected using the improved instrument, the SEM statistical methodology was followed to produce better construct measurement; this will be used to construct the path analysis model to confirm the contingency theory of information systems. The analysis pursues the triangulation method, as suggested by Bruce (2005), in which both exploratory (EFA) and confirmatory factor analysis (CFA) techniques were sequentially deployed twice in this study—once in the instrument development stage with the first sample round of 63 cases aiming to adjust measurement items and produce better instrument validity as well as reduce the instrument bias, and the second time after the whole sample of 117 cases were collected. At this stage, the overall aim is to purify the final constructs and their validity; when constructs are converted to the path analysis model, this will increase the chance of generating a better fit to the data in the SEM model to assess the measurement models' validity (convergent validity, discriminant validity and nomological validity). Four approaches have been adopted following the suggestions by Hair (2010) and Bruce (2005): (I) EFA to evaluate construct validity (factorial, convergent and discriminant validity); (II) assessing construct reliability (internal consistency of the observed indicator variables using alpha statistics); (III) CFA to evaluate the construct validity (GOF indices, convergent, discriminant and nomological validity); and (IV) assessing construct reliability (internal consistency of the observed indicator variables using alpha, AVE and composite reliability).

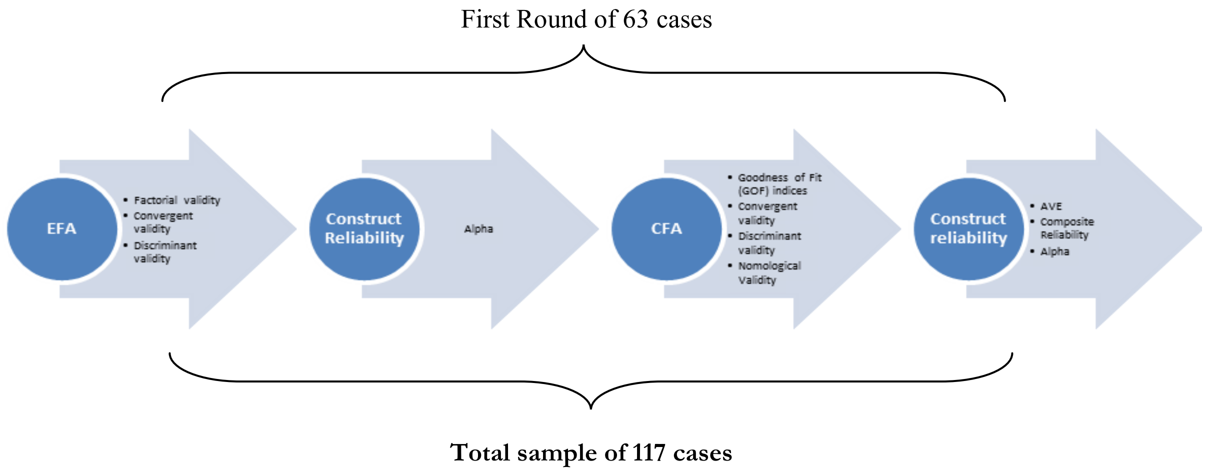


Figure 46: Steps into construct measurement validity

To avoid complexity, in the following discussion we will report on the final EFA, reliability test and CFA representing the whole sample of 117 cases; however, the adjustment made toward instrument improvement in EFA and CFA with the first 63 cases is mentioned in the Appendix.

5.2.1 Exploratory factor analysis (EFA) assessment

As stated in the methodology chapter, EFA is used to empirically obtain the initial validation set of factors representing constructs under investigation. In this analysis, two main statistical analysis values were obtained: The first is KMO and Bartlett's test of sphericity value, while the second is the factor analysis items loading (discussed in detail in the methodology). The acceptable value in the KMO test is 0.6 or above and Bartlett's test of sphericity sig value is 0.05 or smaller. Varimax as a rotation method was selected as suggested by Pallant (2005); a factor-loading threshold of 0.45 was fixed as the minimum value, as suggested by Lewis *et al.* (1995). The results from EFA are given in the Appendix. Careful judgement was applied when dropping items from further analysis; this was based on the threshold loading and theoretical relevance of the items. The result from EFA assessment achieved initial factorial, discriminant and convergent validation of 22 constructs. Once the constructs were loaded with their items, the Cronbach's alpha test for reliability was conducted.

Table 31: Initial analysis of constructs reliability.

No	Name of Construct(s)	Construct Dimensions (Second Order latent variable)	Construct Sub-Dimensions (First Order Latent variable)	Cronbach's Alpha	Construct Reliability
1	SISP Success	Capabilities	Capabilities	0.839	✓
		Objectives	Analysis	0.855	✓
			Alignment	0.939	✓
			Cooperation	0.963	✓
2	SISP Processes	Rationality	Flow	0.951	✓
			Comprehensiveness	0.932	✓
			Focus	0.882	✓
			Formalization	0.910	✓
		Adaptability	Participation	0.933	✓
			Consistency	0.898	✓
		Intuition	Intuition	0.810	✓
3	SISP Context	Organisation structure	Formalisation	0.920	✓
			Centralisation	0.884	✓
		Resource	Planning resource	0.881	✓
		Leadership orientation	Collaborative	0.899	✓
			Creative	0.911	✓
			Controlling	0.921	✓
			Competing	0.938	✓
		Organisation strategy	Aggressiveness	0.900	✓
			Proactiveness	0.883	✓
			Riskiness	0.891	✓
		Environment Uncertainty	Hostility	0.587	×
			Heterogeneity	0.851	✓
			Dynamism	0.712	✓

As shown in Table (31), the values of alpha are all above the minimum accepted value, except the construct labelled 'Hostility', which is below the minimum accepted value and constantly shows a lower value even with items dropping; thus, it will be excluded from further analysis. Otherwise, where lower values were found below the acceptable reliability value, adjustment was made by dropping the less reliable measurement items from further analysis. With the initial validation of constructs under investigation, this gives the researcher confidence to carry on the assessment of measurement construct validation. The next stage will be the CFA and further assessments.

5.2.2 Confirmatory factor analysis (CFA) assessment

In CFA, the researcher specifies the factor structure on the basis of a 'good' theory and then uses CFA to determine whether there is empirical support for the proposed theoretical factor structure. As stated in the methodology section, the purpose of CFA is to identify latent factors that account for variation and covariation among a set of indicators using common factor measurement models; the maximum likelihood method will be used to improve parameter estimates (Brown, 2006). When we evaluate the measures of the default model, two broad approaches will be used: The first is to examine the GOF indices and whether they have met the minimum suggested value, while the second is to evaluate the construct validity and reliability of the specified measurement model. Here, convergent validity, discriminant validity, nomological validity and the construct reliability using AVE and composite reliability all will be assessed. In the following discussion, each construct is assessed separately, specified as the theory suggests using first- and second-order CFA.

5.2.3 CFA measurement models for the SISP success construct

The confirmatory factor measurement model for the SISP success construct was specified according to the theory and prior study, as mentioned in the operationalisation section. The success construct has two dimensions: SISP 'capabilities' and SISP 'objective'. The objective dimension has three sub-dimensions, specifically 'analysis objective, alignment objective and cooperation objective'.

5.2.3.1 SISP success measurement model proposition

Proposition 1: Significance covariance among the 21 observed variables was represented by a restricted four latent variable; each observed variable represents a particular latent variable of SISP success, and each observed variable is reflective only of a single latent variable (i.e. loads only on one factor). The four latent variables are positively correlated. Proposition 2: The SISP success construct is conceptualised to include four different latent variables, represented by 21 observed variables.

5.2.3.2 Statistical analysis of SISP success using the CFA measurement model

Initial Model Fit indices

Table 32: SISP success model fit indices.	
Model Fit indices guideline	**Initial first-order model fit indices**
Chi-square= *P*> 0.05	0.000
Chi-square/DF= value between 2 and 5	1.752
GFI=≥ 0.90	0.784
RMSEA=≤ 0.05 to 0.08	0.80
PCLOSE=>50	0.001
NFI=≥ 0.90	0.871
CFI=≥ 0.90	0.940

Modification of the CFA model of SISP success

In the first attempt to measure the SISP success construct, the initial fit indices were to some extent acceptable; however low GFI and NFI were reported; this provides an incentive to further investigate the model statistics to determine the reason behind the comparatively low fit index.

Table 33: SISP success correlations, covariances estimate.						
Covariances			**Estimate**	**S.E.**	**C.R.**	**P**
Analysis	<-->	Alignment	.464	.087	5.327	***
Analysis	<-->	Cooperation	.482	.092	5.249	***
Alignment	<-->	Cooperation	.727	.121	6.026	***
Analysis	<-->	Capabilities	-.005	.041	-.127	.899
Alignment	<-->	Capabilities	-.053	.049	-1.088	.277
Cooperation	<-->	Capabilities	-.021	.058	-.353	.724
Correlations			**Estimate**			
Analysis	<-->	Alignment	.790			
Analysis	<-->	Cooperation	.666			
Alignment	<-->	Cooperation	.808			
Analysis	<-->	Capabilities	-.014			
Alignment	<-->	Capabilities	-.114			
Cooperation	<-->	Capabilities	-.036			

The covariance and correlation estimates showed negative values and insignificant P values, suggesting that the exogenous variables labelled ‘capabilities’ are the cause of this negativity; at this stage, the nomological validity assumption is being violated, which suggests that there is significant covariance and positive correlations between the constructs in the measurement model. Based on this assumption, the capabilities construct was eliminated from further analysis. When the analysis was repeated with the exclusion of ‘capabilities’, the model fit still did not match what was expected, but the covariance was significant and correlations between constructs were all positively correlated; therefore, further estimates from the analysis output ought to be looked at. When reviewing the regression weights and covariance modification indexes, the M.I for some items was higher than normal. In terms of the M.I’s significance, if the analysis is repeated with the covariance and regression weights treated as free parameters, the discrepancy will fall by M.I value.

Table 34: Modification index SISP success construct.

Items	Regression Weights		M.I.	Par Change
co7	<---	Capabilities	4.264	-.257
co7	<---	ca2	5.461	-.186
co7	<---	co4	4.913	.131
co7	<---	al6	5.298	.129
co7	<---	al4	4.784	.138
co7	<---	al2	6.531	.172
co6	<---	ca6	5.600	-.234
co6	<---	al5	4.677	.120
co5	<---	co7	4.084	.094
co5	<---	al4	4.858	.116
co4	<---	ca2	4.124	-.129
co4	<---	co7	7.059	.118
co2	<---	ca2	8.070	.084
co2	<---	al4	4.309	-.049
co1	<---	co6	4.299	-.034

Items	Covariances		M.I.	Par Change
s21	<-->	Alignment	9.685	.094
s20	<-->	Alignment	12.154	.109
s20	<-->	Analysis	9.092	-.100
s19	<-->	Cooperation	4.586	-.073
s19	<-->	Alignment	9.070	.076
s19	<-->	s21	11.715	.122
s19	<-->	s20	11.196	.123
s18	<-->	s21	20.249	.153
s18	<-->	s20	8.979	.105
s15	<-->	s20	12.691	-.049

As result of the modification process and in order to achieve better fit for the first-order measurement model, some items were eliminated in addition to the 'capabilities' construct; these items are co1, co5, co6 and co7, which were part of the 'cooperation' construct measurement items. The results indicate that the modified model fits better to the sample data than the initial model. Details of the variance, covariance, regression weight and squared multiple correlation are shown in the output of the standardised/unstandardised estimates in Figure (47), (48), (49) and (50) and Table (42). In Table (42), the data indicate that the standardised regression weights of all variables loading onto their respective factors are between 0.78 and 0.98, with critical ratios (t-values) of above 1.96, indicating that all the regressions are statistically significant at the 95% confidence level. The second-order confirmatory factor analysis, as shown in Figure (49) and (50), indicated that all the three constructs from the first order load very well onto the second-order SISP success construct. The significant regression weights of the SISP success on each construct had closer values, and the critical ratios (t-value) were all above 1.96 the model fit index, demonstrating equivalent results to the first-order CFA.

5.2.3.3 Reporting construct validity for the SISP success

Convergent validity

Standardised loadings estimates must be statistically significant and should be 0.5 or higher, and ideally 0.7 or higher. All items loading achieved values of 0.78 to 0.94; see Table (42). AVE should be 0.5 or greater to suggest adequate convergent validity. All constructs achieved AVE values above of 0.5; see Table (42). Composite reliability should be 0.7 or higher to indicate adequate convergence or internal consistency. All constructs achieved composite reliability values above 0.7; see Table (42). The results showed that the three SISP success constructs in the CFA models demonstrated convergent validity.

Discriminant validity

All construct variance extracted (AVE) estimates should be larger than the corresponding squared inter-construct correlation (SIC) estimates. If this is the case, it means that the indicator variables have more in common with the construct they are associated with than they do with the other constructs (Hair, 2010). In the columns below, we have calculated the SIC from the inner construct correlations (IC) obtained from the correlations (Table (41)) and AVE (Table (42)).

Table 35: SISP success constructs discriminant validity.				
Correlations			**IC**	**SIC= IC^2**
Analysis	<-->	Alignment	0.791	0.625
Analysis	<-->	Cooperation	0.675	0.455
Alignment	<-->	Cooperation	0.813	0.660
Constructs			**AVE**	**SIC**
Analysis			0.820	0.625, 0.455
Alignment			0.853	0.660, 0.625
Cooperation			0.893	0.455, 0.660

A comparison of the AVE estimates for each factor with the SIC associated with that factor is shown in Table (35). All AVE estimates in Table 35 are larger than the corresponding SIC estimates. This means that the indicators have more in common with the construct they are associated with than they do with other constructs. Thus, the SISP success construct demonstrates discriminant validity.

Nomological validity

Examining the significance for covariance and positive correlations between the constructs in the measurement model tests nomological validity; this is demonstrated in Table (36).

Table 36: modified SISP success correlations, covariances estimate.						
Covariances			**Estimate**	**S.E.**	**C.R.**	**P**
Analysis	<-->	Alignment	.467	.087	5.341	***
Analysis	<-->	Cooperation	.489	.095	5.166	***
Alignment	<-->	Cooperation	.733	.124	5.910	***
Correlations						**Estimate**
Analysis	<-->	Alignment				.791
Analysis	<-->	Cooperation				.675
Alignment	<-->	Cooperation				.813

Table 37: summary of SISP success construct estimate.						
Observed variables	R^2	Standard first-order loadings*			Construct Reliability	
		Analysis	Alignment	Cooperation	Composite reliability	AVE
an5	0.620	0.787 (**)			0.789	0.820
an6	0.734	0.857(9.649)				
an8	0.667	0.817(9.195)				
*Analysis****		-	0.467	0.489		
*Analysis*****		-	0.791	0.675		
al1	0.637		0.798(**)		0.832	0.853
al2	0.738		0.859(10.841)			
al3	0.709		0.842(10.538)			
al4	0.776		0.881(11.248)			
al5	0.793		0.981(11.427)			
al6	0.713		0.845(10.586)			
*Alignment****		-	-	0.733		
*Alignment*****		-	-	0.813		
co2	0.893			0.945(**)	0.882	0.893
co3	0.716			0.846(13.865)		
co4	0.790			0.889(15.655)		
*Cooperation****		-	-	-		
*Cooperation*****		-	-	-		

*Standard first order loading is the standard regression weight of individual variable's loading onto one of SISP processes sub-dimension.
** Critical ration (t-value) from the un-standardised solution, where (CR) has no value it means that the regression weight of the variable is fixed at 1.
***Is the covariances between the SISP success sub-dimension
****Is the correlations between the SISP success sub-dimension

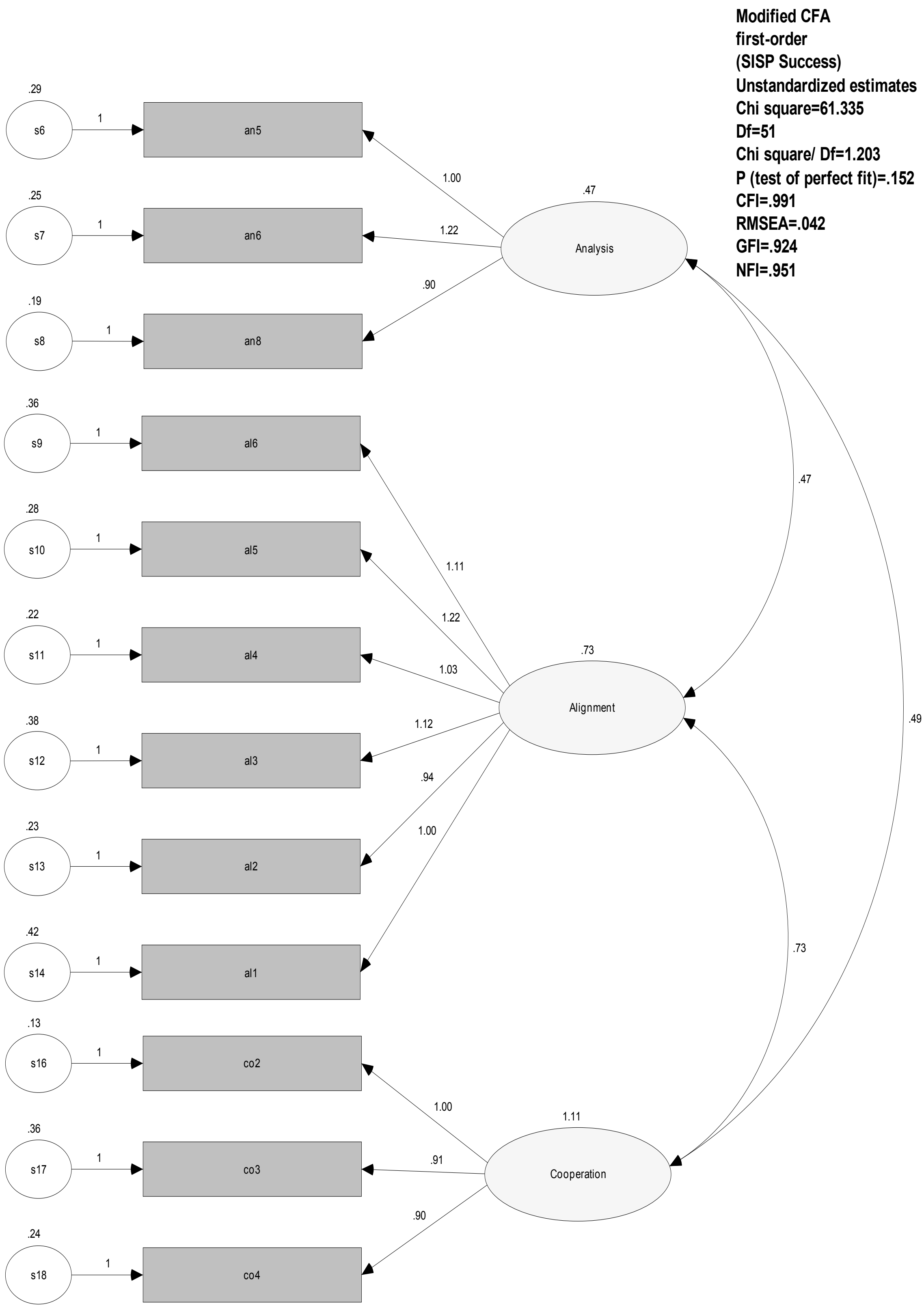


Figure 47: un-standardized first orders CFA SISP success.

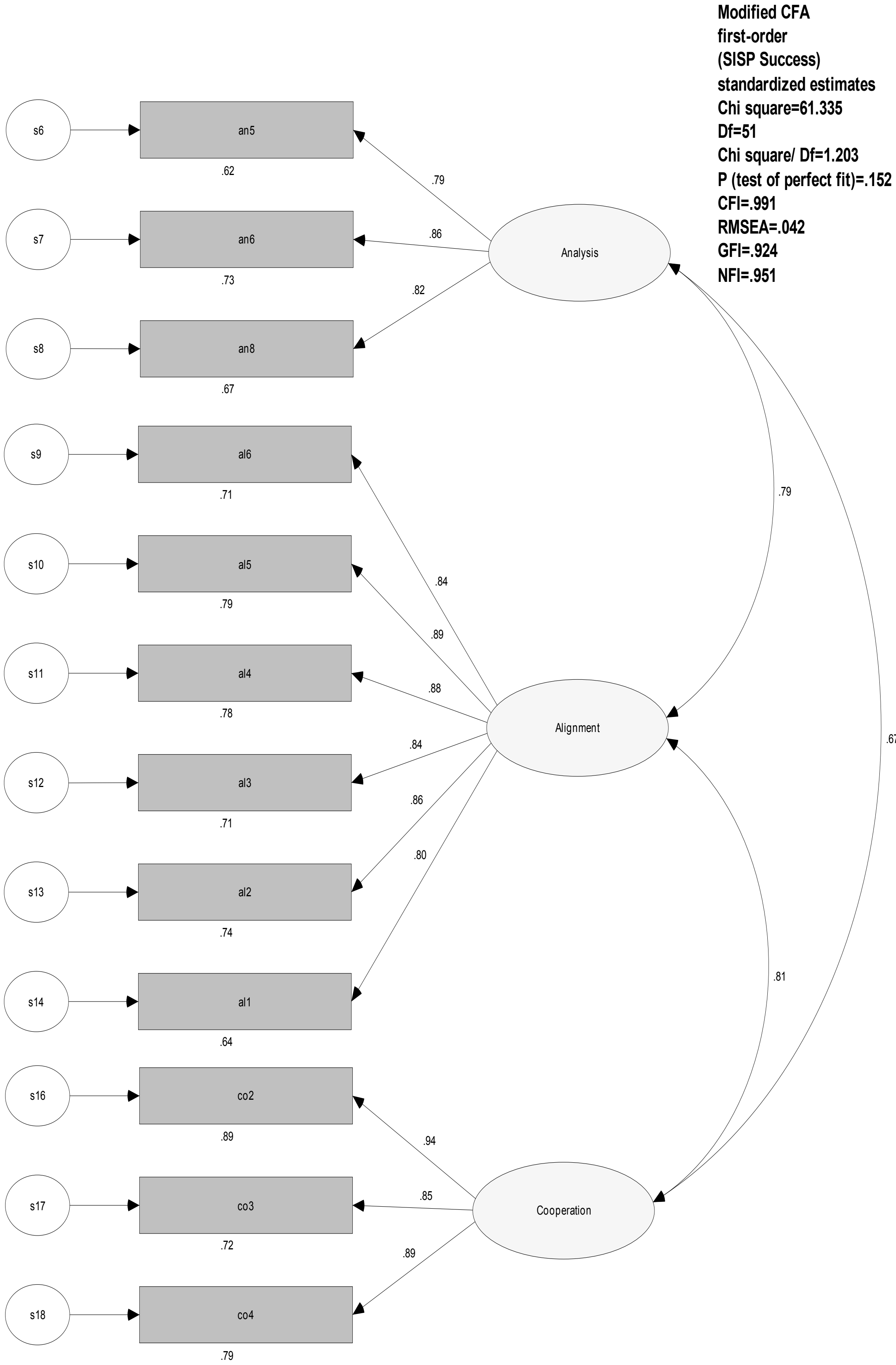


Figure 48: standardized first orders CFA SISP success.

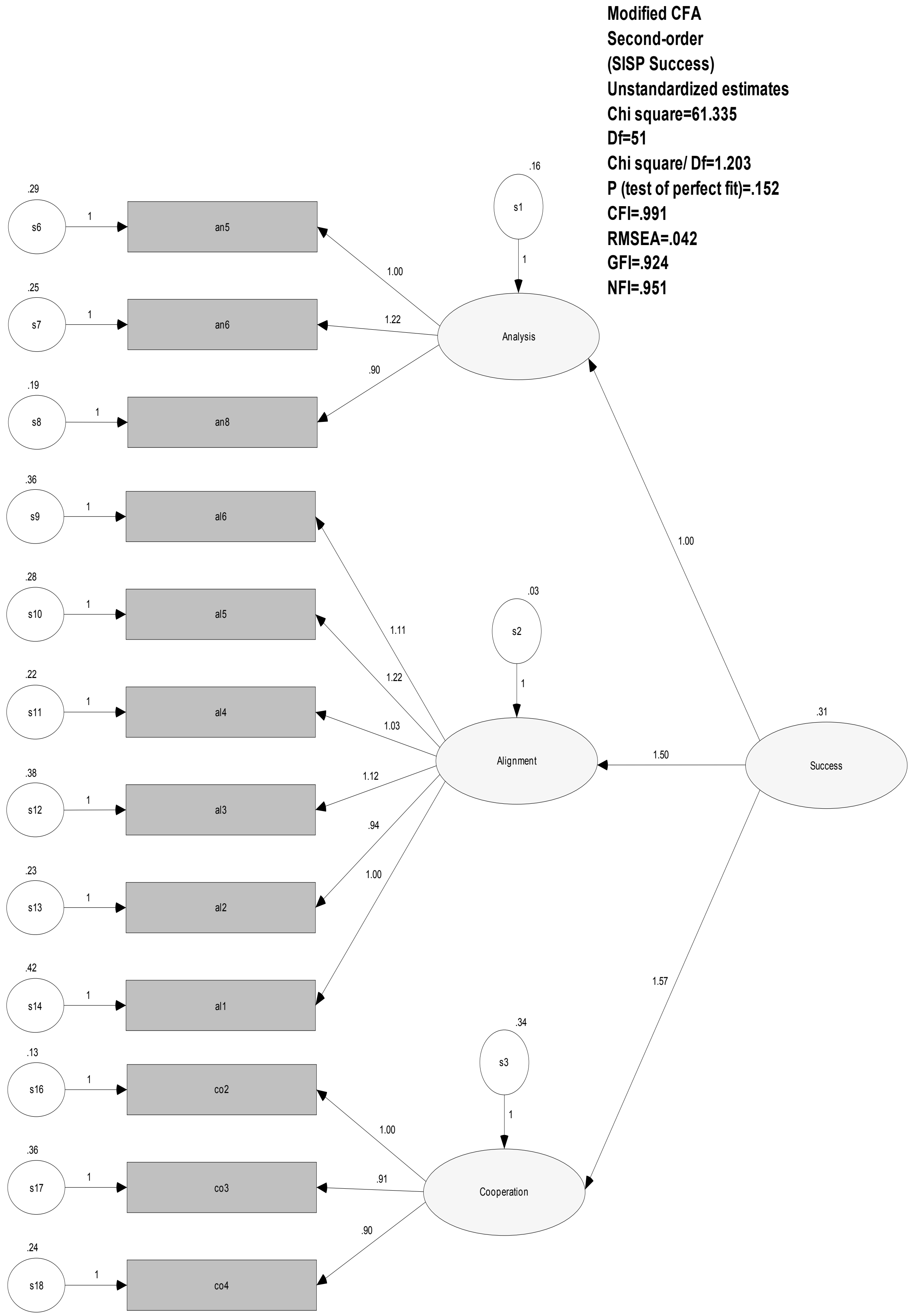


Figure 49:un-standardized second orders CFA SISP success.

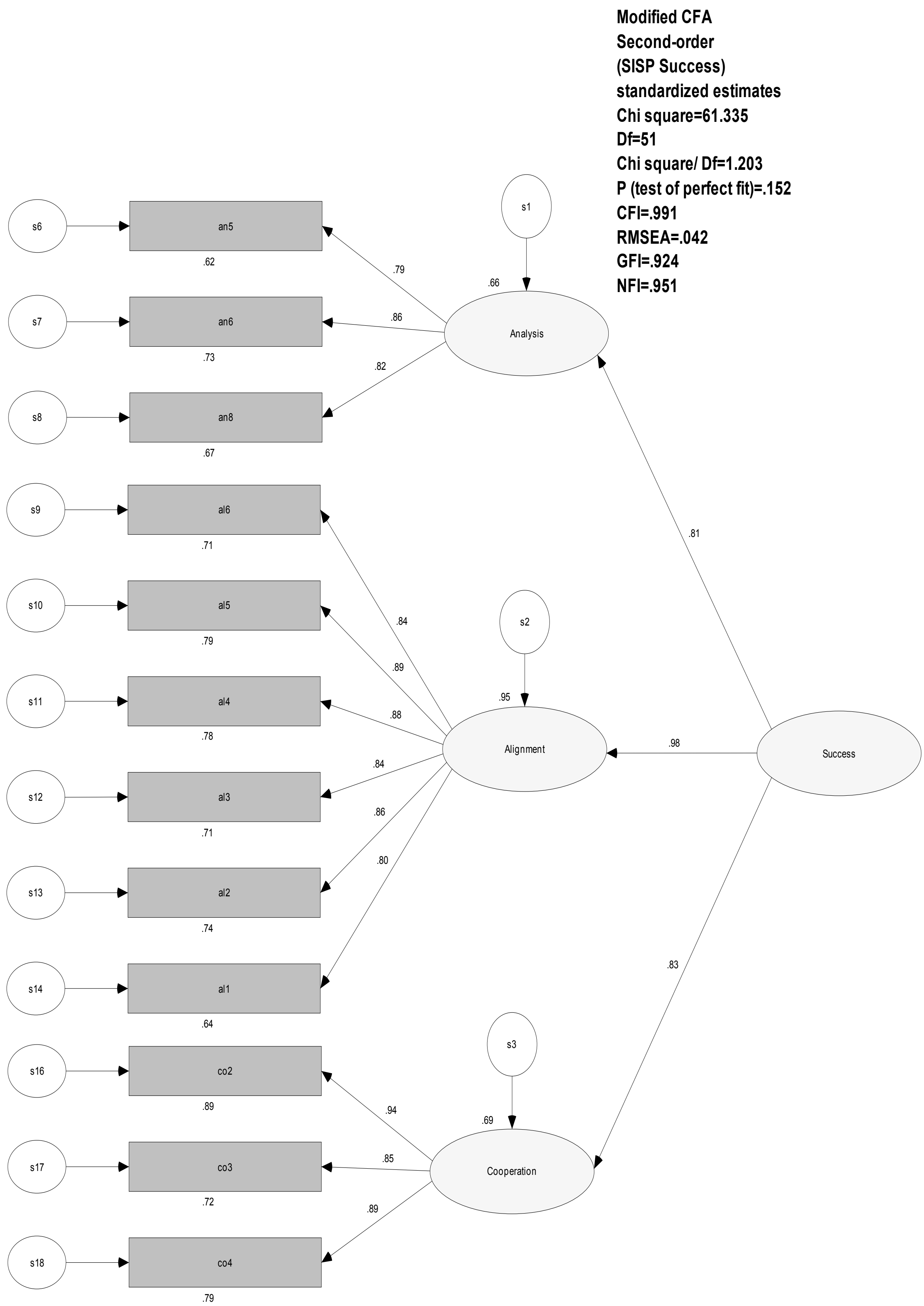


Figure 50: standardized second orders CFA SISP success.

5.2.4 CFA measurement models for SISP process constructs

The confirmatory factor measurement model for SISP process constructs has been specified according to the theory and prior study, as mentioned in the operationalisation chapter. The process construct has seven dimensions, labelled as SISP flow, comprehensiveness, focus, formalisation, participation, consistency and Intuition. The first four dimensions represent the rationality stage of IS planning processes; the participation and consistency approaches represent the adaptability stage of IS planning; and 'intuition' represents the initial stage of planning.

5.2.4.1 SISP process measurement model propositions

P1: There is significant covariance among the 27 observed variables represented by a restricted seven latent variable, each observed variable represents a particular latent variable of SISP processes and each observed variable is reflective of a single latent variable (i.e. loads only on one factor). The seven latent variables are positively correlated.

P2: The SISP process construct is conceptualised to contain seven different latent variables represented by 27 observed variables.

P3: The SISP process rationality construct is conceptualised to contain five latent variables labelled as flow, comprehensiveness, focus, formalisation and participation), which are represented by 14 observed variables.

P4: The SISP process adaptability construct is conceptualised to contain two latent variables labelled as participation and consistency; these are represented by 10 observed variables.

P5: The SISP process intuition construct is conceptualised to contain one latent variable labelled (intuition), and is represented by three observed variables.

5.2.4.2 Statistical analysis of the SISP process in the CFA measurement model

Table 38: Initial first-order CFA measurement model fit index.

Model Fit indices guideline	Initial first-order model fit indices
Chi-square= P> 0.05	0.000
Chi-square/DF= value between 2 and 5	1.575
GFI=≥ 0.90	0.770
RMSEA=≤ 0.05 to 0.08	0.70
PCLOSE=>50	0.004
NFI=≥ 0.90	0.859
CFI=≥ 0.90	0.942

5.2.4.3 Modification of the model

In the first attempt to measure SISP process constructs, the initial fit indices were acceptable to some extent; however, a low GFI and NFI were reported. This suggests that the model statistics should be further investigated to determine the reason for the comparatively low fit index. The modification index for the initial measurement model is provided in Appendix 1. The improvement in the model fit index was not a one-step action, but rather a process of modification that takes into consideration the relationship between the increase of the model fit index and the decrease of the model discrepancy when deciding whether to drop an item or construct.

- The covariance and correlation estimates showed positive values and significant P values, construct covariance was significant and the correlation between constructs was positive. This gives an early sign of nomological validity. However, even with this result, the model fit indices were not satisfactory. Therefore, M.I was the next evaluation model result to be assessed.
- The 'formalisation' measurement items' covariance with other measurement error and regression weight with other items repeatedly showed the highest discrepancy values in the model; therefore, 'formalisation' was eliminated from further analysis.
- When the analysis was repeated with the exclusion of 'formalisation', the model fit still did not match what was expected. However, the covariance was significant and the constructs were all positively correlated; therefore. Further adjustment in the M.I output was considered.
- When reviewing the regression weights and covariance modification index, the M.I for some items was higher than normal.
- As a result of the modification process and in order to achieve a better fit for the first-order measurement model some items were eliminated in addition to the 'formalisation' construct; these were ac1, ac2, ac3, ap4, ap5, rc3 and rf2. This left one construct with just two measurement items and the rest of the constructs with three items each.

After the final run of the modified model, the results indicated that the model fit better to the sample data than the initial one. Details of the variance, covariance, regression weight and squared multiple correlation are shown in the output of the standardised/unstandardised estimates in Figure (51) and (52) and Table (42). Table (42) presents the construct analysis outputs; the data indicate that the regression weights of all variables loading onto their respective factors were between 0.683 and 0.953; the critical ratios (t-values) of above 1.96 indicate that all the regressions were statistically significant at the 95% confidence level.

The initial CFA for the second-order SISP process constructs derived from the adjusted first-order CFA showed a lack of fit to the data; therefore, modification of the second order was carried out. Item 'ap2' had to be dropped due to its higher discrepancy, and covariance was drawn between flow and participation disturbance and between comprehensive and focus disturbance. After these modifications to the second order CFA, the model fit index was accepted; the modifications are shown in Figure (53) and (54) and the model statistics are given in Table (42). The significant regression weights of the SISP processes on each construct had closer values, although intuition showed the lowest value of 0.564 comparing with the highest of 0.911 between processes and consistency. The critical ratios (t-values) were all above 1.96.

The second-order SISP process sub-constructs of rationality, adaptability and intuition were specified and separately modelled according to Segars and Grover (2005), and using the validated constructs from SISP process improved variables. The three latent variables (flow, comprehensiveness and focus) were represented by SISP process rationality; the constructs loaded very well and provided acceptable fit indices with significant regression weights, as shown in Figure (55) and (56). Similar results were achieved for SISP process sub-construct 'adaptability', which was represented by the two validated latent variables of participation and consistency, as shown in Figure (57) and (58). 'Intuition' is a multi-item single construct; the construct validity was assessed as part of the first-order CFA. The reason for separately measuring the three sub-dimensions as 'sub-constructs' was that in the SEM 'path analysis model' they will be tested using different path models to provide more insight into the impact of each 'sub-construct' on SISP success, as well as to test the effect of organisational context on each dimension of the SISP process.

5.2.5 Construct validity of the SISP process

Convergent validity

- Standardised loadings estimates must be statistically significant and should be 0.5 or higher, and ideally 0.7 or higher. All item loadings achieved values between 0.68 and 0.95, as shown in Table (42).
- AVE should be 0.5 or greater to suggest adequate convergent validity. All constructs achieved AVE values above 0.5; see Table (42).
- Composite reliability should be 0.7 or higher to indicate adequate convergence or internal consistency. All constructs achieved composite reliability values above 0.7; see Table (42).

Therefore, the six SISP process constructs in the CFA models demonstrated convergent validity.

Discriminant validity

All construct AVE estimates should be larger than the corresponding SIC estimates. If this is the case, it means the indicator variables have more in common with the construct they are associated with than they do with the other constructs (Hair, 2010). In Table (39), we have calculated the SIC from the IC obtained from the correlations.

Table 39: SISP processes discriminant validity.				
Correlations			IC	SIC= IC^2
Flow	<-->	Comprehensive-ness	0.799	0.638
Flow	<-->	Focus	0.724	0.524
Flow	<-->	Participation	0.767	0.588
Flow	<-->	Consistency	0.827	0.721
Flow	<-->	Intuition	0.440	0.193
Comprehensive-ness	<-->	Focus	0.846	0.715
Comprehensive-ness	<-->	Participation	0.605	0.366
Comprehensive-ness	<-->	Consistency	0.765	0.585
Comprehensive-ness	<-->	Intuition	0.490	0.240
Focus	<-->	Participation	0.496	0.246
Focus	<-->	Consistency	0.704	0.495
Focus	<-->	Intuition	0.512	0.262
Participation	<-->	Consistency	0.694	0.481
Participation	<-->	Intuition	0.299	0.089
Consistency	<-->	Intuition	0.571	0.267

Compares the average variance extracted estimates for each factor with the squared inter-construct correlations (SIC) associated with that factor, as shown in Table (40). All average variance extracted (AVE) estimates are larger than the corresponding squared inter-construct correlation estimates (SIC). This means the measurement items have more in common with the construct they are associated with than they do with other constructs. Therefore, the SISP processes six constructs CFA model demonstrates discriminant validity.

Table 40: SISP processes discriminant validity.		
Constructs	AVE	SIC
Flow	0.923	0.638,0.524,0.588,0.721,0.193
Comprehensive-ness	0.883	0.715,0.366,0.585,0.240,0.638
Focus	0.860	0.246,0.495,0.262,0.715,0.524
Participation	0.862	0.246,0.089,0.588,0.366,0.481
Consistency	0.932	0.267,0.481,0.495,0.585,0.721
Intuition	0.778	0.267,0.089,0.262,0.240,0.193

Nomological validity

Nomological validity is tested by examining the significance for covariance and positive correlations between the constructs in the measurement model the two tables below demonstrate nomological validity.

Table 41: modified SISP processes correlations, covariances estimate.						
Covariances			**Estimate**	**S.E.**	**C.R.**	**P**
Flow	<-->	Comprehensive-ness	.850	.145	5.858	***
Flow	<-->	Focus	.438	.081	5.431	***
Flow	<-->	Participation	.707	.123	5.743	***
Flow	<-->	Consistency	.898	.145	6.202	***
Flow	<-->	Intuition	.350	.094	3.712	***
Comprehensive-ness	<-->	Focus	.468	.083	5.663	***
Comprehensive-ness	<-->	Participation	.511	.106	4.811	***
Comprehensive-ness	<-->	Consistency	.760	.133	5.694	***
Comprehensive-ness	<-->	Intuition	.356	.091	3.910	***
Focus	<-->	Participation	.238	.057	4.137	***
Focus	<-->	Consistency	.398	.075	5.321	***
Focus	<-->	Intuition	.212	.053	3.976	***
Participation	<-->	Consistency	.598	.111	5.394	***
Participation	<-->	Intuition	.188	.071	2.665	.008
Consistency	<-->	Intuition	.424	.096	4.417	***
Correlations			**Estimate**			
Flow	<-->	Comprehensive-ness	.799			
Flow	<-->	Focus	.724			
Flow	<-->	Participation	.767			
Flow	<-->	Consistency	.827			
Flow	<-->	Intuition	.440			
Comprehensive-ness	<-->	Focus	.846			
Comprehensive-ness	<-->	Participation	.605			
Comprehensive-ness	<-->	Consistency	.765			
Comprehensive-ness	<-->	Intuition	.490			
Focus	<-->	Participation	.496			
Focus	<-->	Consistency	.704			
Focus	<-->	Intuition	.512			
Participation	<-->	Consistency	.694			
Participation	<-->	Intuition	.299			
Consistency	<-->	Intuition	.571			

Modified first-order measurement model

Table 42: summary of SISP processes construct estimate.

Observed variables	R^2	Standard first-order loadings*						Construct Reliability	
		Flow	Comprehensi ve-ness	Focus	Participation	Consistency	Intuition	Composite reliability	AVE
rf3	.819	.905**						0.917	0.923
rf4	.903	.951 (17.846)							
rf5	.835	.914 (16.029)							
Flow ***		-	.850	.438	.707	.898	.350		
Flow****		-	.799	.724	.767	.827	.440		
rc2	.686		.829**					0.870	0.883
rc4	.857		.926 (12.862)						
rc5	.801		.895 (12.208)						
Comprehensive-ness***		-	-	.468	.511	.760	.356		
Comprehensive-ness****		-	-	.846	.605	.765	.490		
ro1	.631			.795**				0.843	0.860
ro2	.793			.890 (11.016)					
ro5	.831			.912 (11.334)					
Focus***		-	-	-	.238	.398	.212		
Focus****		-	-	-	.496	.704	.512		
ap1	.713				.845**			0.844	0.862
ap2	.648				.805 (10.488)				
ap3	.878				.937 (12.923)				
Participation***		-	-	-	-	.598	.188		
Participation****		-	-	-	-	.694	.299		
ac4	.828					.910**		0.927	0.932
ac5	.908					.953 (16.696)			
Consistency***		-	-	-	-	-	.424		
Consistency****		-	-	-	-	-	.571		
pi1	.558						.747**	0.735	0.778
pi2	.819						.905 (8.311)		
pi3	.467						.683 (7.078)		
Intuition***	-	-	-	-	-	-	-		
Intuition****	-	-	-	-	-	-	-		

*Standard first order loading is the standard regression weight of individual variable's loading onto one of SISP processes sub-dimension.
** Critical ration (t-value) from the un-standardised solution, where (CR) has no value it means that the regression weight of the variable is fixed at 1.
***Is the covariances between the SISP processes sub-dimension
****Is the correlations between the SISP processes sub-dimension

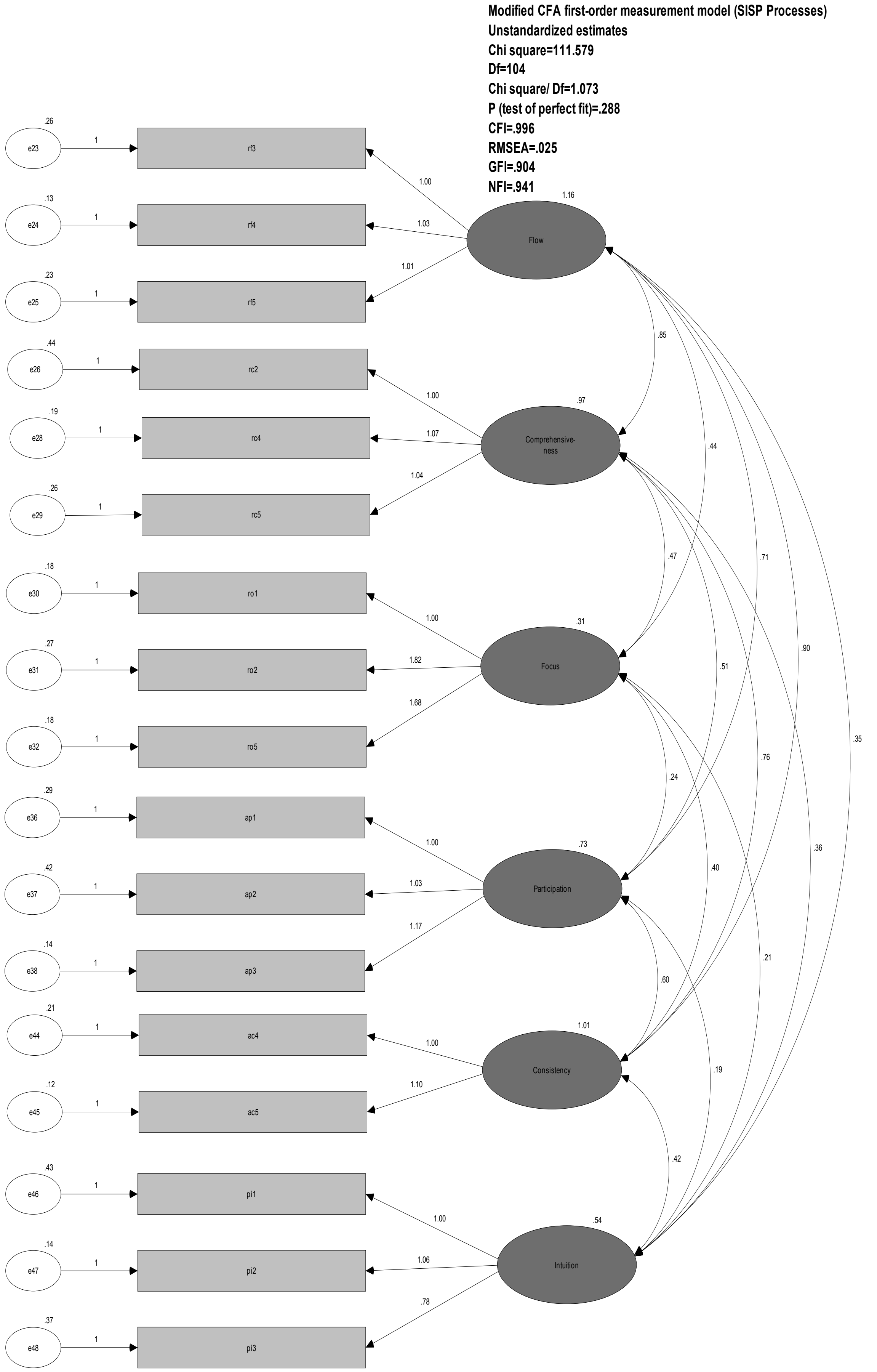


Figure 51: un-standardized first orders CFA SISP processes.

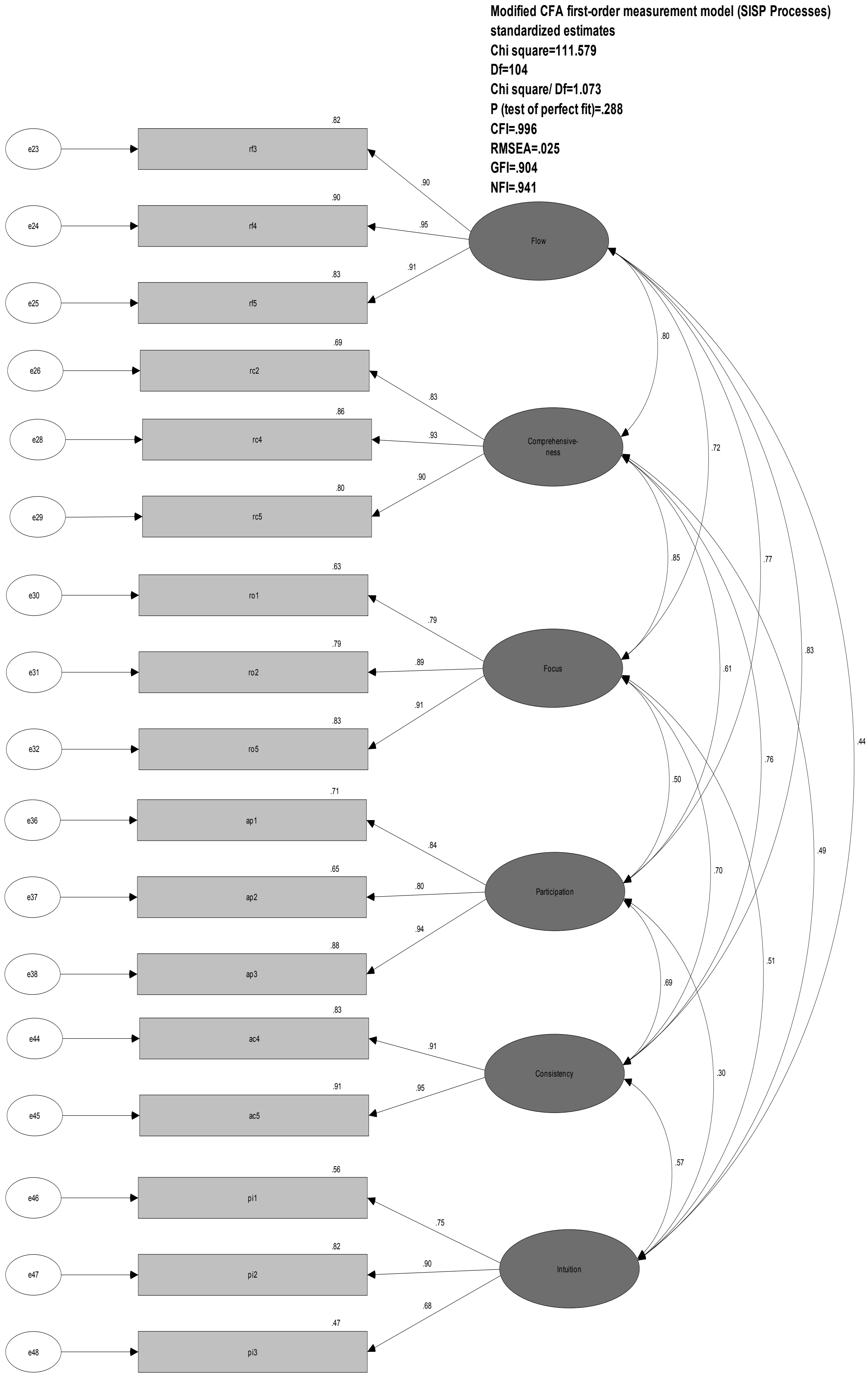


Figure 52: Standardized first orders CFA SISP processes.

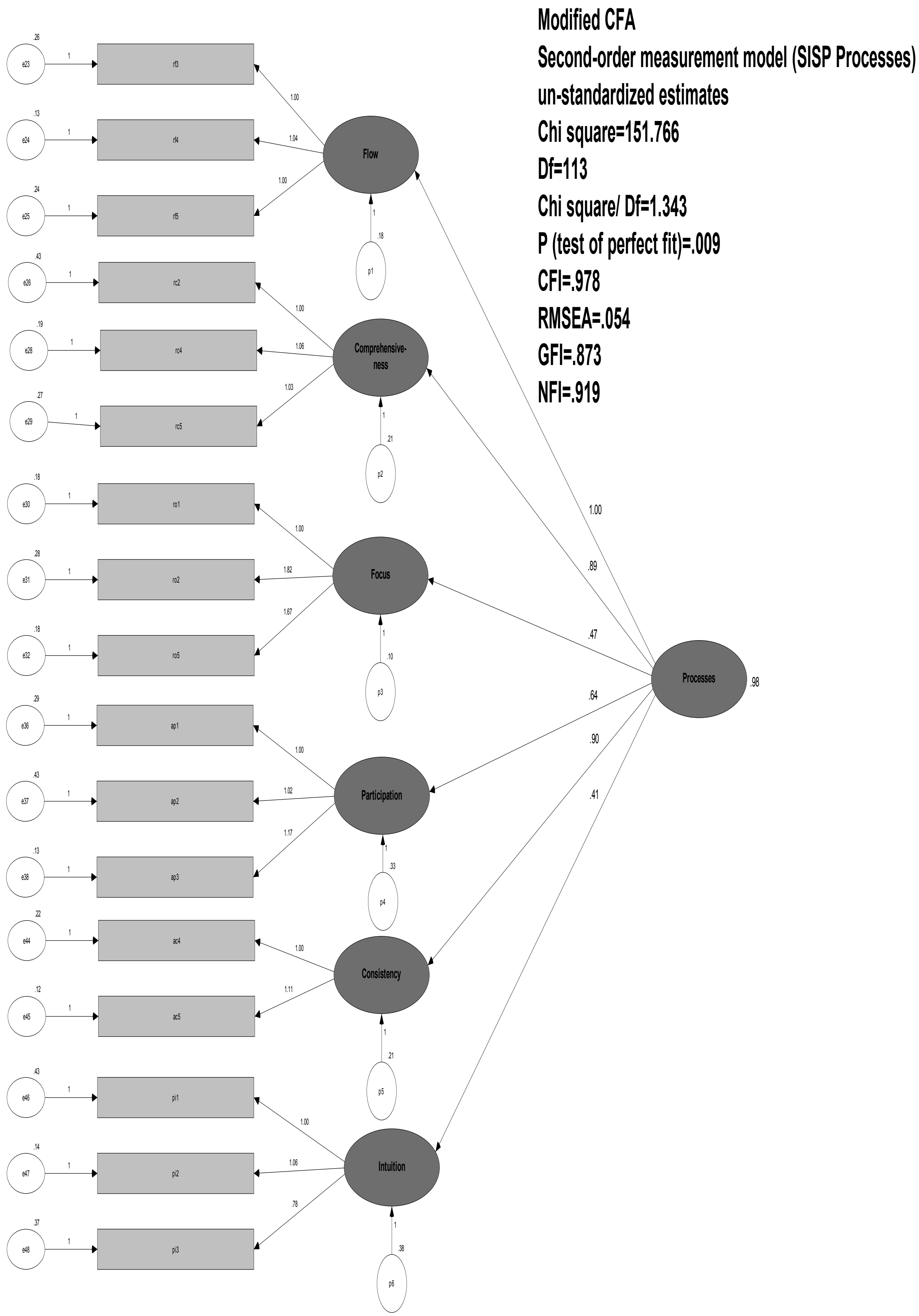


Figure 53:un-standardized second orders CFA SISP processes.

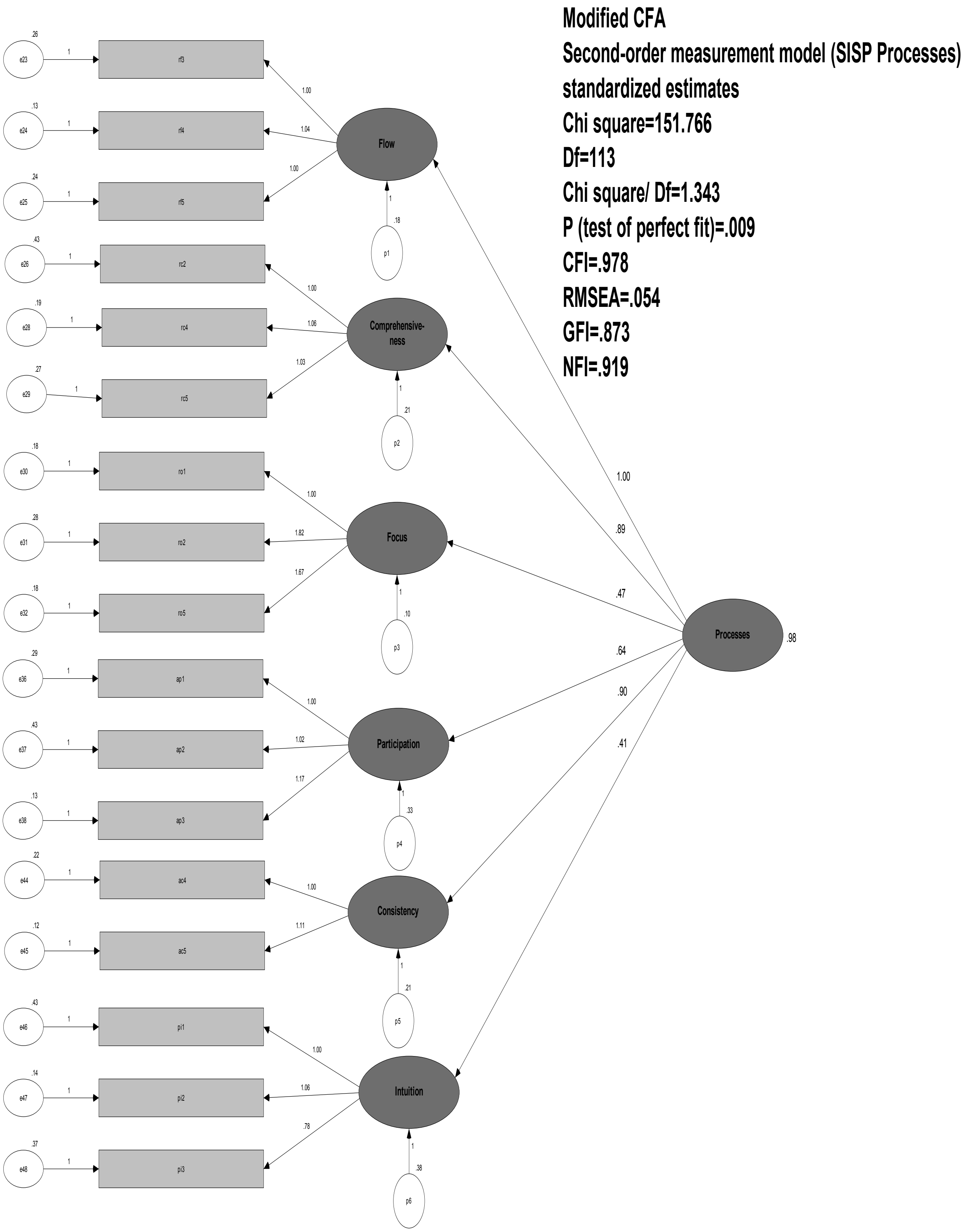


Figure 54: standardized second orders CFA SISP processes.

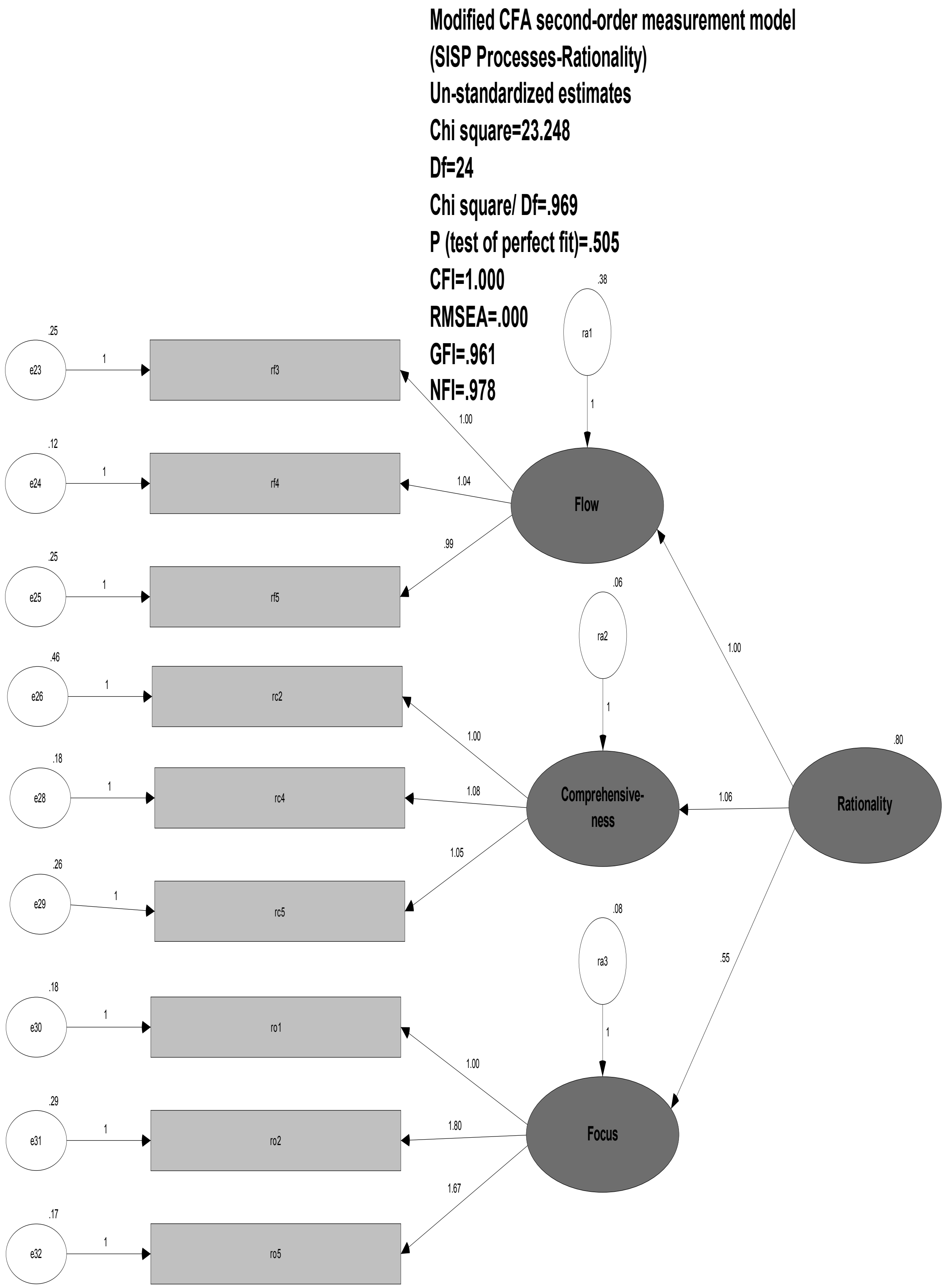


Figure 55: un-standardized second orders CFA SISP processes-rationality.

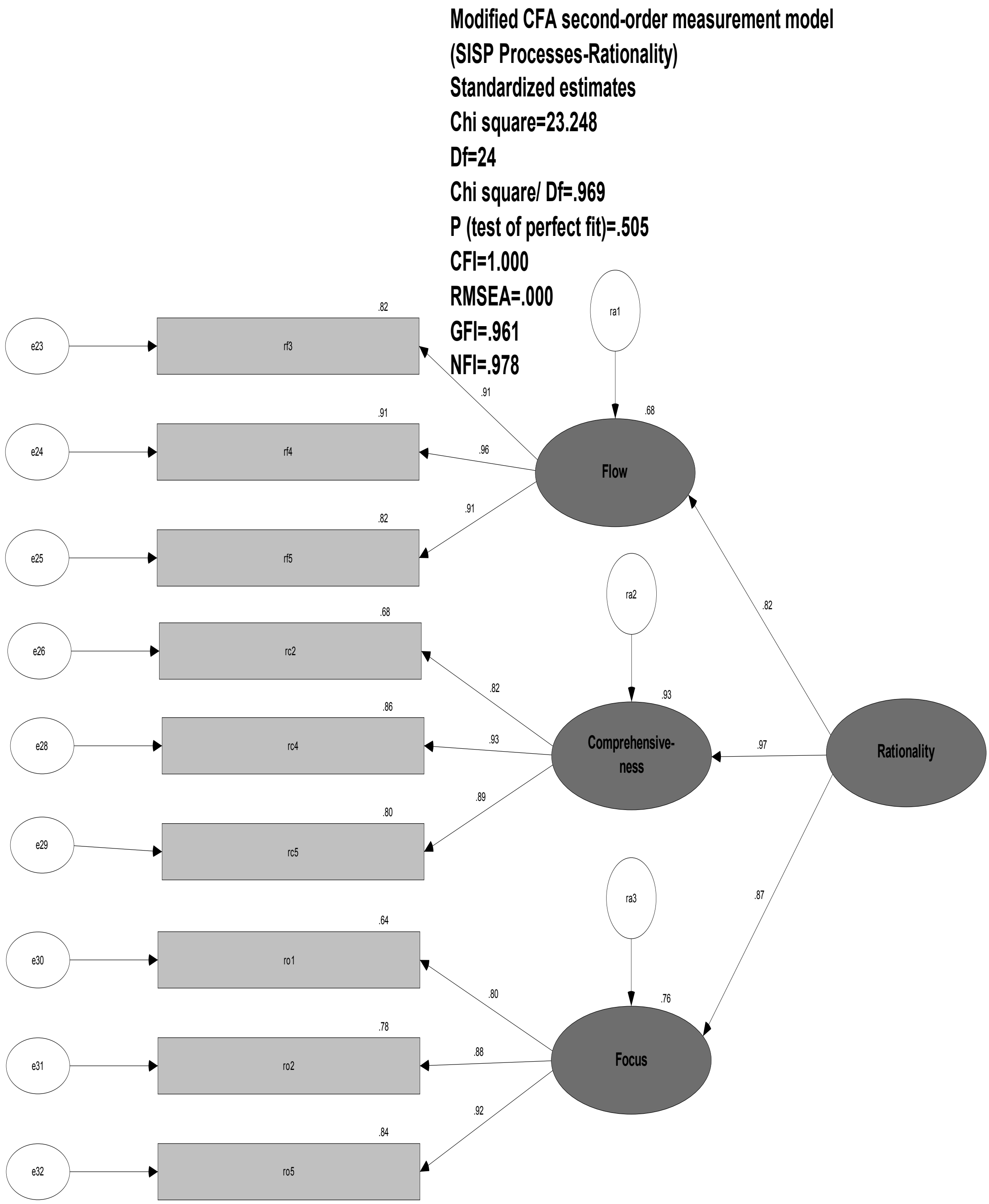


Figure 56: standardized second orders CFA SISP processes-rationality.

Initial CFA second-order measurement model (SISP Processes)
unstandardized estimates
Chi square=2.991
Df=4
Chi square/ Df=.748
P (test of perfect fit)=.559
CFI=1.000
RMSEA=.000
GFI=.990
NFI=.993

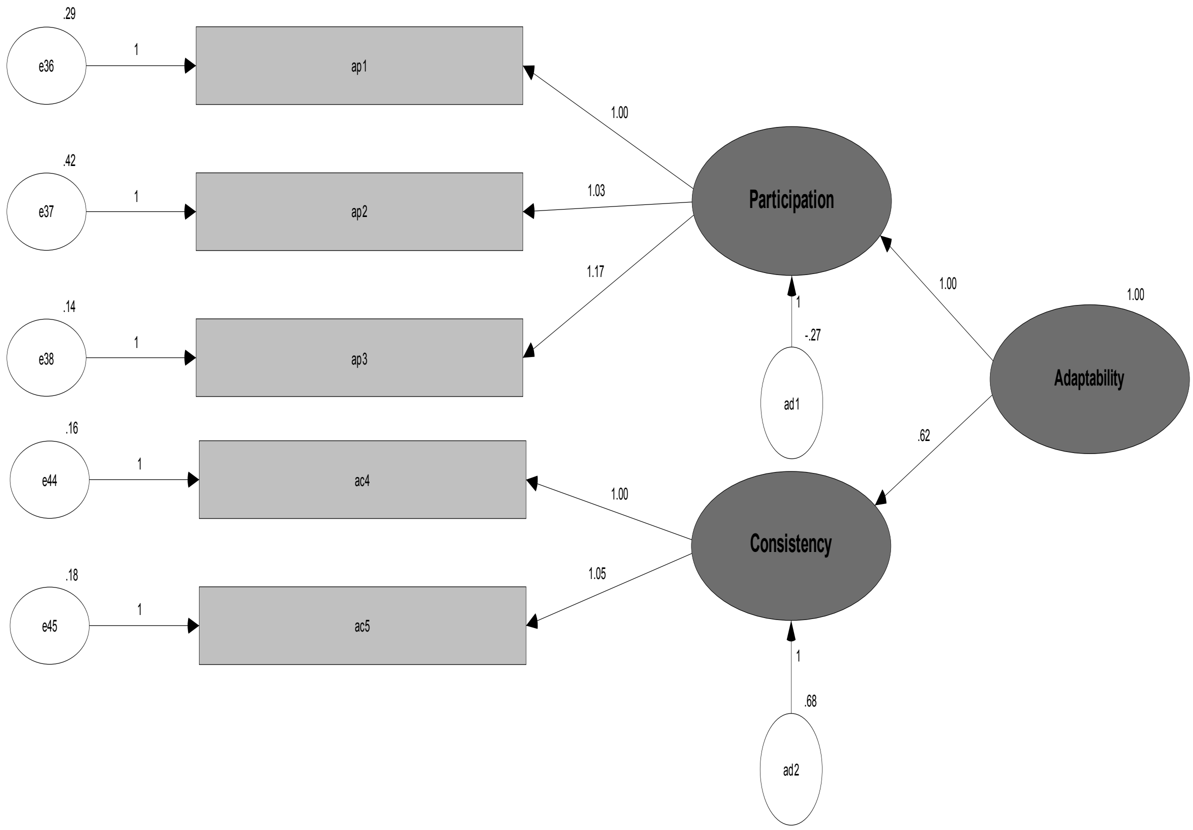


Figure 57:un-standardized second orders CFA SISP processes-adaptability.

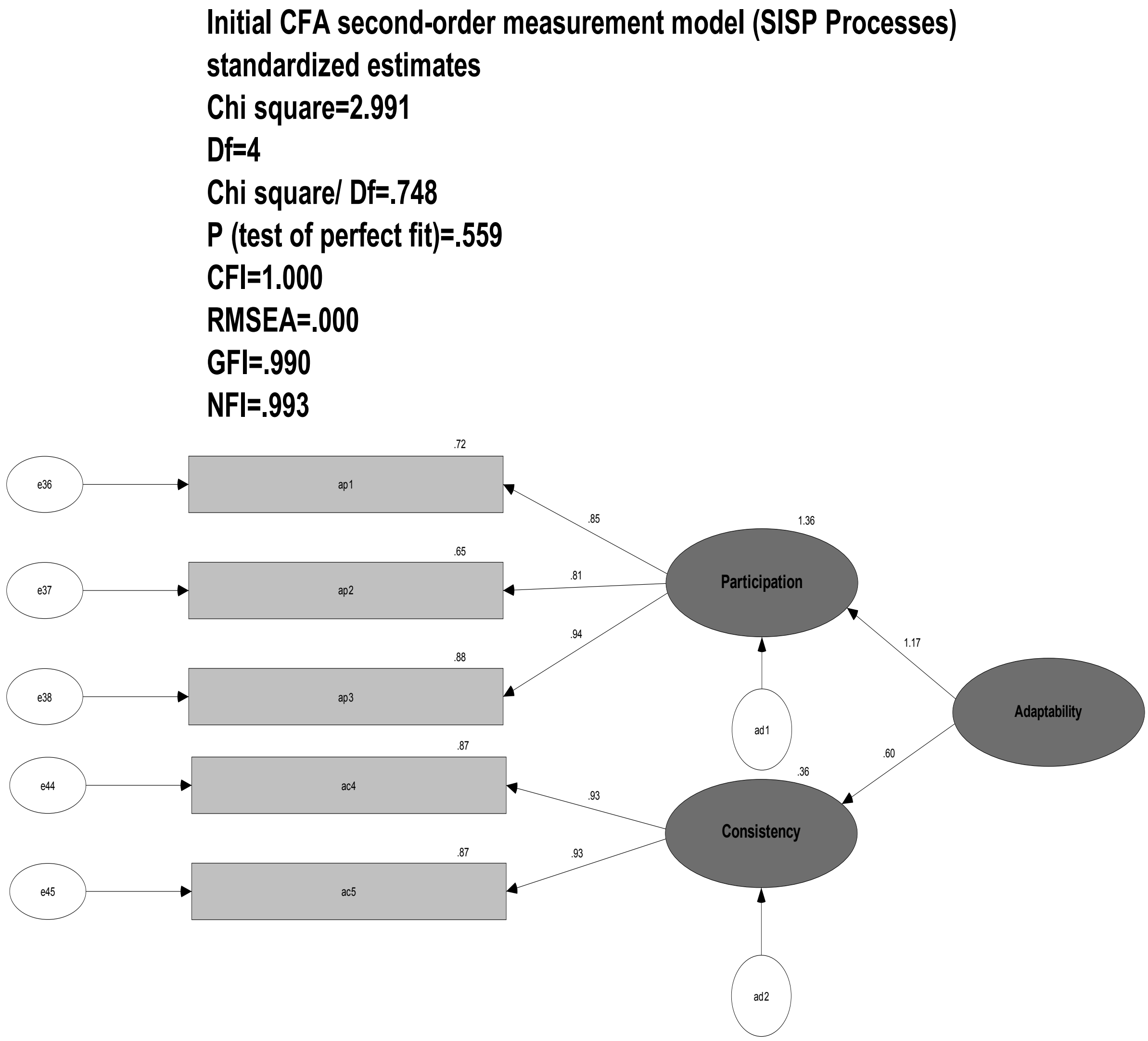


Figure 58 Standardized second orders CFA SISP processes-adaptability

5.2.6 CFA measurement models for SISP organisation context

The confirmatory factor measurement model for SISP organisation context construct is specified according to the theory and prior study, as mentioned in the operationalisation chapter, the research identified five constructs in SISP organisation context labelled as (Organisation structure, Planning resource, Leadership orientation, Organisation strategy, Environment uncertainty) all of which are multidimensional multi-items constructs apart from planning resources construct. Each multidimensional latent construct of SISP Organisation context will be measured independently as first order CFA and second order CFA. The following Table (43) represent the modified items for organisation context constructs.

Table 43: modified items of organisation context constructs.		
Construct name	**Item Code**	**Reason for dropping**
Organisation structure	*Sc4*	High correlation discrepancy
	Sc5	
Resource	*Pr2*	High correlation discrepancy
	Pr4	
	Pr6	
	Pr8	
Leadership orientation	*Cl1*	High correlation and covariance discrepancy
	Cl6	
	Cr2	High correlation discrepancy
	Cr4	
	Cr6	
	Ct1	High correlation discrepancy
	Ct5	
	Cp2	High correlation discrepancy
	Cp4	
	Cp6	
Organisation strategy	*Ag2*	*All "Aggressiveness construct"* High correlation and covariance discrepancy
	Ag3	
	Ag4	
Environment uncertainty	-	-

Before reporting on each construct validity, the AVE and composite reliability is calculated for each constructs, as shown in Table (44), there are two constructs did not meet the minimum value expected to conclude that their measurement scales consistent, this proved that even the construct shows acceptable fit index, still that does not represent the reliability of measurement items, for this reason both the "Resource" and "Dynamism" constructs will be excluded from further analysis.

Table 44: SISP organisation context CR and AVE test.				
No	**Name of Construct(s)**	**Composite Reliability**	**Variance Extracted**	**Construct Validity**
1	Formalisation	0.808	0.834	✓
2	Centralisation	0.794	0.824	✓
3	Resource	0.583	0.496	×
4	Collaborate	0.777	0.810	✓
5	Creative	0.835	0.854	✓
6	Controlling	0.854	0.870	✓
7	Competing	0.828	0.850	✓
8	Pro-activeness	0.825	0.848	✓
9	Riskiness	0.838	0.857	✓
10	Heterogeneity	0.777	0.811	✓
11	Dynamism	0.570	0.641	×

5.2.7 Construct validity (Organisation structure)

Convergent Validity

- Standardized loadings estimates must be statistically significant and should be 0.5 or higher, and ideally 0.7 or higher. (All items loading achieved values of 0.778 to 0.898 refer to the Table (50).

- AVE should be 0.5 or greater to suggest adequate convergent validity. All constructs achieved AVE values above 0.5 refer to the Table (44).
- Composite reliability should be 0.7 or higher to indicate adequate convergence or internal consistency. All constructs achieved composite reliability values above 0.7 refer to the Table (49). Thus, the "organisation structure" two constructs CFA models demonstrate convergent validity.

Discriminant Validity

All construct variance extracted (AVE) estimates should be larger than the corresponding squared inter-construct correlation estimates (SIC). If they are, this means the indicator variables will have more in common with the construct they are associated with than they do with the other constructs (Hair, 2010). In the columns below author have calculated the SIC (Squared Inter-construct correlations) from the IC (Inner construct correlations) obtained from the correlations Table (45).

Table 45: discriminant validity organisation structure.

Correlations			IC	SIC= IC^2
Formalisation	<-->	Centralisation	0.777	0.603
Constructs			**AVE**	**SIC**
Formalisation			0.808	0.603
Centralisation			0.794	0.603

Comparing the average variance extracted (AVE) estimates for each factor with the squared inter-construct correlations (SIC) associated with that factor, as shown in **Table (45).** All (AVE) estimates are larger than the corresponding squared inter-construct correlation estimates (SIC). This means the measurement items have more in common with the construct they are associated with than they do with other constructs. Therefore, the "organisation structure" two constructs CFA model demonstrates discriminant validity.

Nomological Validity

Nomological validity is tested by examining the significance for covariance and positive correlations between the constructs in the measurement model, both Tables (46, 47) below demonstrate nomological validity.

Table 46: modified correlations, covariances estimate.

Covariances			Estimate	S.E.	C.R.	P
Formalisation	<-->	Centralisation	0.63	0.118	5.393	***
Correlations						**Estimate**
Formalisation	<-->	Centralisation				.77

Modified first-order measurement model

Table 47: summary of organisation structure estimate.			
Observed variables	R^2	**Standard first-order loadings***	
		Formalisation	**Centralisation**
sf1	0.60	0.77(**)	
sf2	0.67	0.81(9.543)	
sf3	0.72	0.84(10.015)	
sf4	0.80	0.89(10.792)	
sf5	0.69	0.83(9.844)	
Formalisation ***		-	0.63
Formalisation ****		-	0.77
sc1	0.72		0.85(**)
sc2	0.67		0.82(10.089)
sc3	0.63		0.79(9.705)

* Standard first order loading is the standard regression weight of individual variable's loading onto one of Organisation structure sub-dimension.
** Critical ration (t-value) from the un-standardised solution, where (CR) has no value it means that the regression weight of the variable is fixed at 1.
*** Is the covariances between the Organisation structure sub-dimension
**** Is the correlations between the Organisation structure sub-dimension

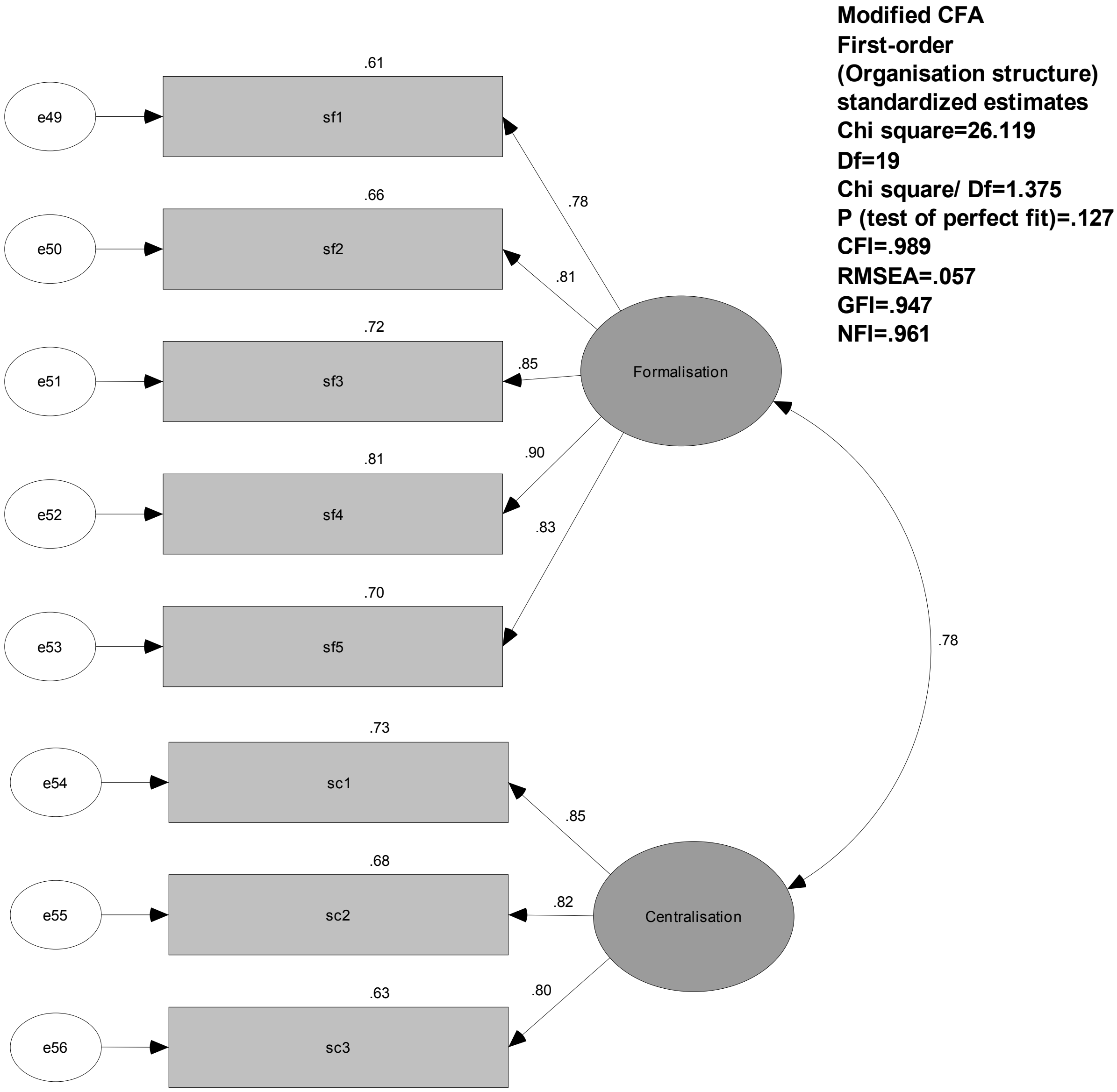


Figure 59 Standardized first orders CFA Organisation structure

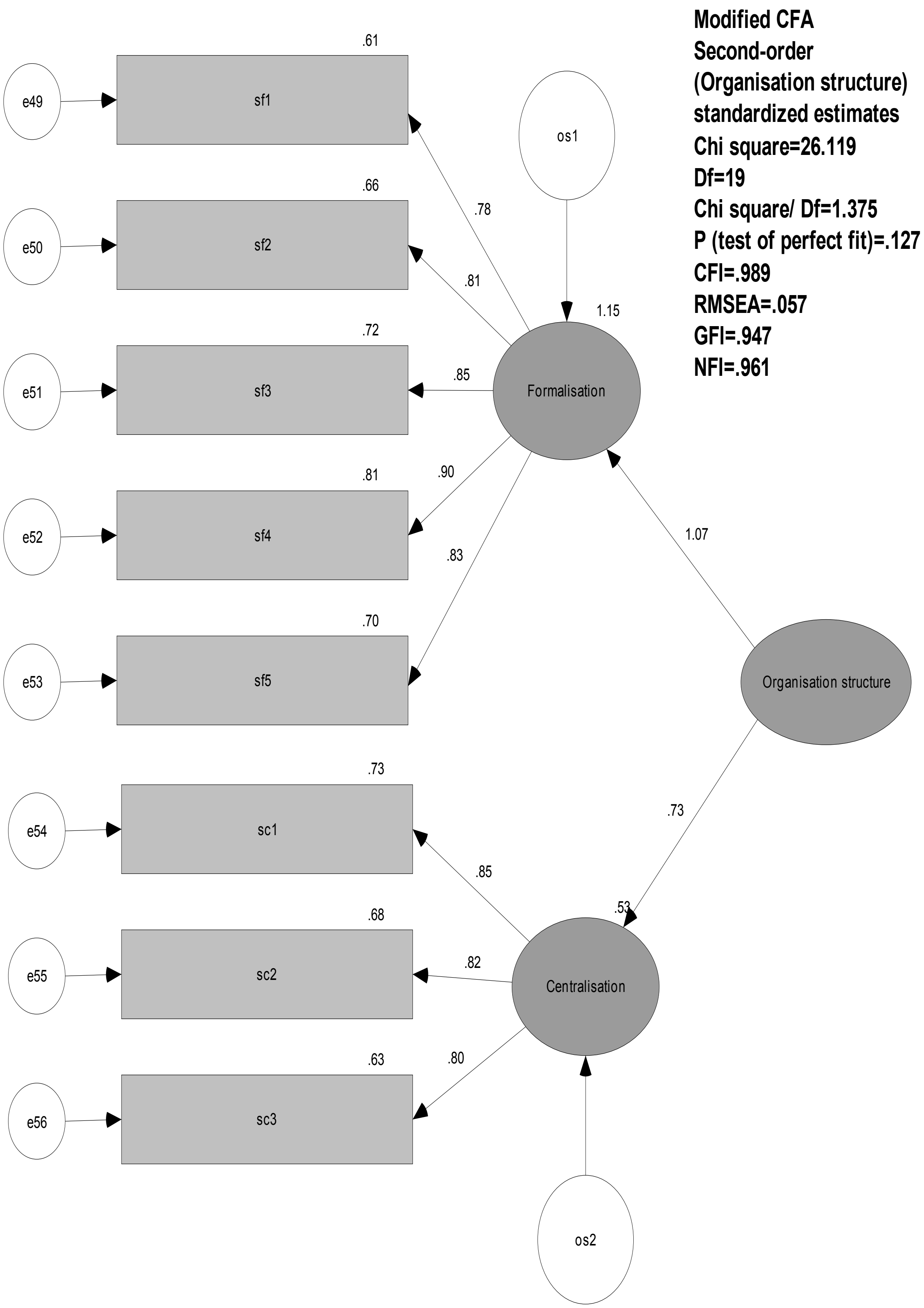


Figure 60: standardized second orders CFA organisation structure

5.2.8 Construct validity (Leadership orientation)

Convergent Validity

- Standardized loadings estimates must be statistically significant and should be 0.5 or higher, and ideally 0.7 or higher. (All items loading achieved values of 0.74 to 0.89 refer to the Table (52).
- The AVE should be 0.5 or greater to suggest adequate convergent validity. (All constructs achieved AVE values above 0.5 refer to the Table (52).
- Composite reliability should be 0.7 or higher to indicate adequate convergence or internal consistency. (All constructs achieved composite reliability values above 0.7 refer to the Table (52). Thus, the "Leadership orientation" four construct CFA models demonstrate convergent validity.

Discriminant Validity

All construct variance extracted (AVE) estimates should be larger than the corresponding squared inter-construct correlation estimates (SIC). If they are, this means the indicator variables have more in common with the construct they are associated with than they do with the other constructs (Hair, 2010). In the table below author have calculated the SIC (Squared Inter-construct correlations) from the IC (Inner construct correlations) obtained from the correlations Table (52). Compares the average variance extracted (AVE) estimates for each factor with the squared inter-construct correlations (SIC) associated with that factor, as shown in the Table (52). All average variance extracted (AVE) estimates are larger than the corresponding squared inter-construct correlation estimates (SIC). This means the measurement items have more in common with the construct they are associated with than they do with other constructs. Therefore, the SISP processes six constructs CFA model demonstrates discriminant validity.

Table 48: discriminant validity for leadership orientation construct.

Correlations			Estimate	SIC= IC^2
Collaborate	<-->	Creative	.497	0.25
Collaborate	<-->	Controlling	.612	0.37
Collaborate	<-->	Competing	.520	0.27
Creative	<-->	Controlling	.380	0.14
Creative	<-->	Competing	.673	0.45
Controlling	<-->	Competing	.579	0.33
Constructs			**AVE**	**SIC**
Collaborate			0.81	0.25, 0.37, 0.27
Creative			0.85	0.25, 0.14, 0.45
Controlling			0.87	0.37, 0.14, 0.33
Competing			0.85	0.27, 0.45, 0.33

Nomological Validity

Nomological validity is tested by examining the significance for covariance and positive correlations between the constructs in the measurement model the two tables below demonstrate nomological validity.

Table 49: modified leadership orientations construct correlations, covariances estimate.						
Covariances			**Estimate**	**S.E.**	**C.R.**	**P**
Collaborate	<-->	Creative	0.320	0.079	4.028	***
Collaborate	<-->	Controlling	0.444	0.095	4.674	***
Collaborate	<-->	Competing	0.295	0.072	4.103	***
Creative	<-->	Controlling	0.420	0.123	3.408	***
Creative	<-->	Competing	0.582	0.114	5.111	***
Controlling	<-->	Competing	0.565	0.121	4.681	***
Correlations			**Estimate**			
Collaborate	<-->	Creative	0.497			
Collaborate	<-->	Controlling	0.612			
Collaborate	<-->	Competing	0.520			
Creative	<-->	Controlling	0.380			
Creative	<-->	Competing	0.673			
Controlling	<-->	Competing	0.579			

Modified first-order measurement model

Table 50: summary of leadership orientations construct estimate.					
Observed variables	R^2	**Standard first-order loadings***			
		Collaborate	**Creative**	**Controlling**	**Competing**
cl2	0.548	0.740(**)			
cl3	0.740	0.860(9.108)			
cl4	0.634	0.796(8.433)			
cl5	0.715	0.845(8.959)			
Collaborate ***		-	0.320	0.444	0.295
Collaborate ****		-	0.497	0.612	0.52
cr1	0.766		0.875(**)		
cr3	0.666		0.816(10.718)		
cr5	0.758		0.870(11.691)		
Creative ***		-	-	0.420	0.582
Creative ****		-	-	0.380	0.673
ct2	0.803			0.896(**)	
ct3	0.692			0.832(11.680)	
ct4	0.778			0.882(12.806)	
Controlling ***		-	-	-	0.565
Controlling ****		-	-	-	0.579
cp1	0.686				0.828(**)
cp3	0.770				0.878(10.981)
cp4	0.712				0.844(10.497)
Competing ***		-	-	-	-
Competing ****		-	-	-	-

*Standard first order loading is the standard regression weight of individual variable's loading onto one of Leadership orientation sub-dimension.
** Critical ration (t-value) from the un-standardised solution, where (CR) has no value it means that the regression weight of the variable is fixed at 1.
***Is the covariances between the Leadership orientation sub-dimension
****Is the correlations between the Leadership orientation sub-dimension

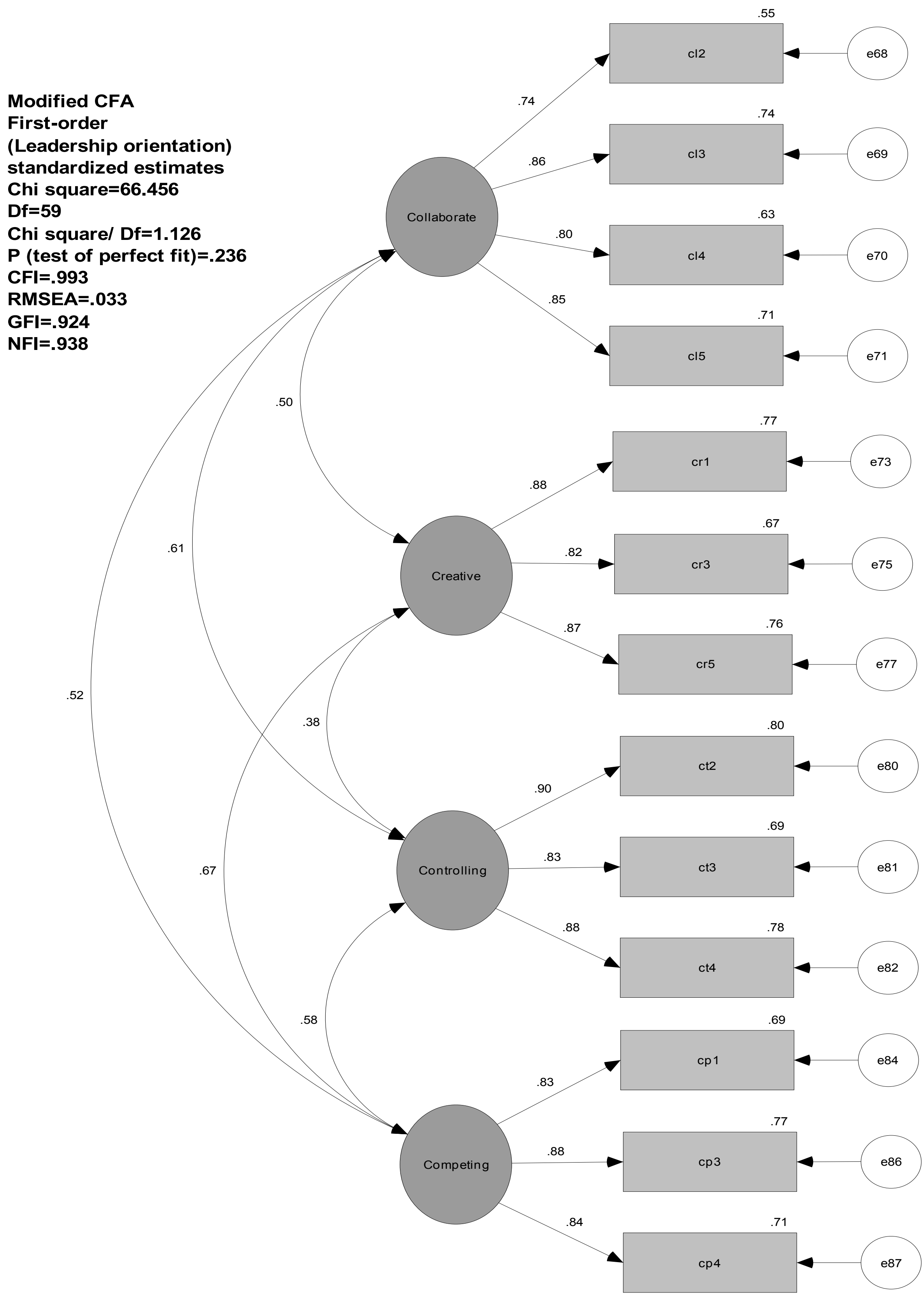


Figure 61: standardized first orders CFA leadership orientations construct

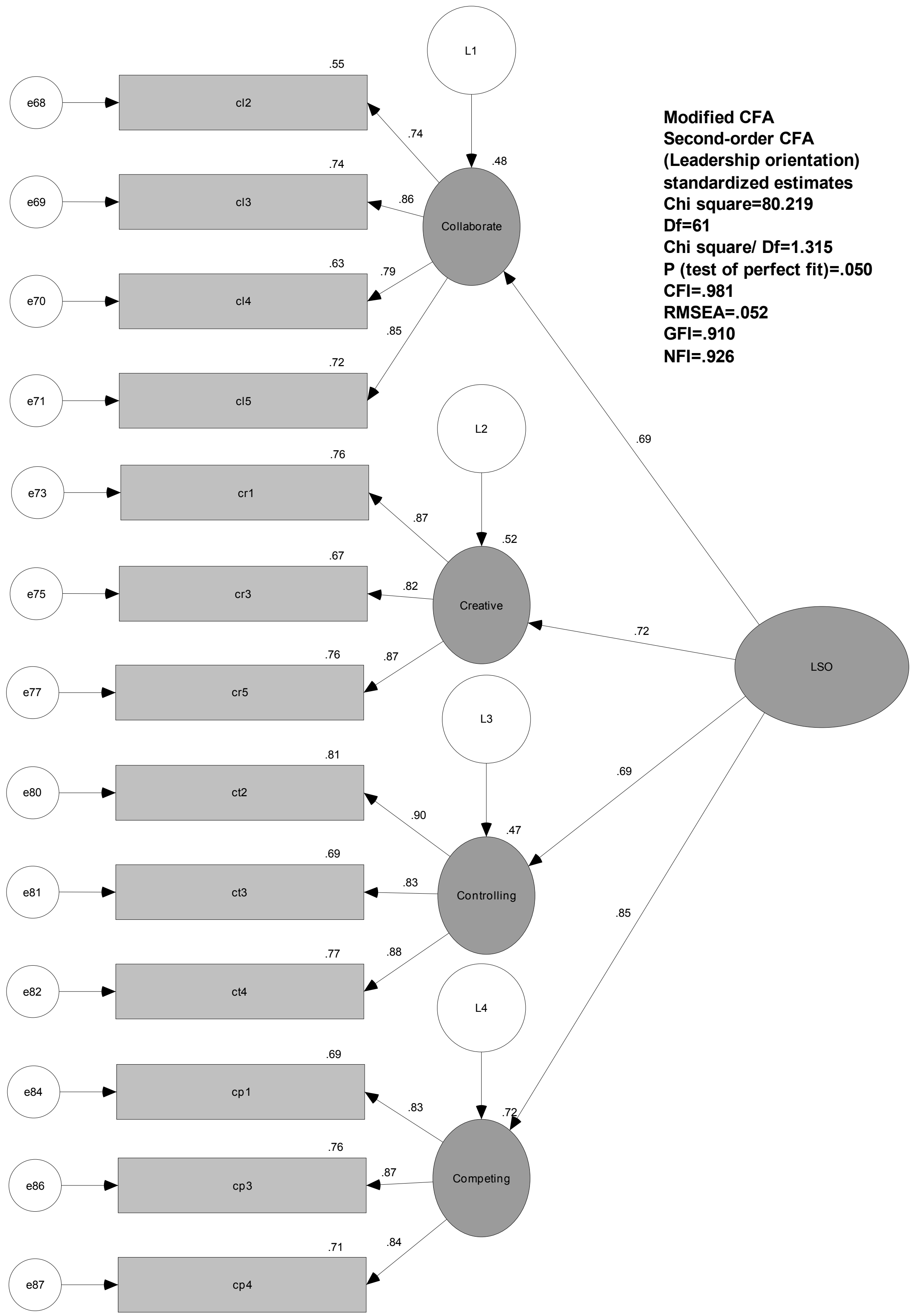


Figure 62: Standardized second orders CFA leadership orientations construct

5.2.9 Reporting construct validity (Organisation strategy)

Convergent Validity

- Standardized loadings estimates must be statistically significant and should be 0.5 or higher, and ideally 0.7 or higher. (All items loading achieved values of 0.78 to 0.93 refer to the Table (53).
- AVE should be 0.5 or greater to suggest adequate convergent validity. (All constructs achieved AVE values above 0.5 refer to the Table (53).
- Composite reliability should be 0.7 or higher to indicate adequate convergence or internal consistency. (All constructs achieved composite reliability values above 0.7 refer to the Table (53). Thus, the "Organisation strategy" construct CFA models demonstrate convergent validity.

Discriminant Validity

All construct variance extracted (AVE) estimates should be larger than the corresponding squared inter-construct correlation estimates (SIC). If they are, this means the indicator variables have more in common with the construct they are associated with than they do with the other constructs (Hair, 2010). In the columns below author have calculate the SIC (Squared Inter-construct correlations) from the IC (Inner construct correlations) obtained from the correlations Table (51).

Table 51: discriminant validity organisation strategy construct

Correlations			IC	SIC= IC^2
Proactiveness	<-->	Riskiness	.430	0.185
Constructs		**AVE**		**SIC**
Pro-activeness		0.825		0.185
Riskiness		0.838		0.185

Compares the average variance extracted (AVE) estimates for each factor with the squared inter-construct correlations (SIC) associated with that factor, as shown in the **Table (51).** All average variance extracted (AVE) estimates are larger than the corresponding squared inter-construct correlation estimates (SIC). This means the measurement items have more in common with the construct they are associated with than they do with other constructs. Therefore, the "Organisation strategy" two constructs CFA model demonstrates discriminant validity.

Nomological Validity

Nomological validity is tested by examining the significance for covariance and positive correlations between the constructs in the measurement model the two tables below demonstrate nomological validity.

Table 52: modified organisation strategy constructs correlations, covariances estimate.

Covariances			Estimate	S.E.	C.R.	P
Proactiveness	<-->	Riskiness	0.418	0.110	3.790	***
Correlations			Estimate			
Proactiveness	<-->	Riskiness	0.430			

Table 53: summary of organisation strategy constructs construct estimate.

Observed variables	R^2	Standard first-order loadings*	
		Proactiveness	Riskiness
po2	0.729	0.854(**)	
po3	0.740	0.860(10.642)	
po4	0.687	0.829(10.280)	
Proactiveness ***		-	0.418
Proactiveness ****		-	0.430
rk2	0.872		0.934(**)
rk3	0.740		0.860(10.642)
rk5	0.605		0.778(10.495)
Riskiness***		-	-
Riskiness****		-	-

*Standard first order loading is the standard regression weight of individual variable's loading onto one of SISP processes sub-dimension.
** Critical ration (t-value) from the un-standardised solution, where (CR) has no value it means that the regression weight of the variable is fixed at 1.
***Is the covariances between the "Organisation strategy" sub-dimension
****Is the correlations between the "Organisation strategy" sub-dimension

Modified CFA
First-order
(Organisation strategy
standardized estimates
Chi square=12.995
Df=8
Chi square/ Df=1.624
P (test of perfect fit)=.112
CFI=.988
RMSEA=.073
GFI=.965
NFI=.970

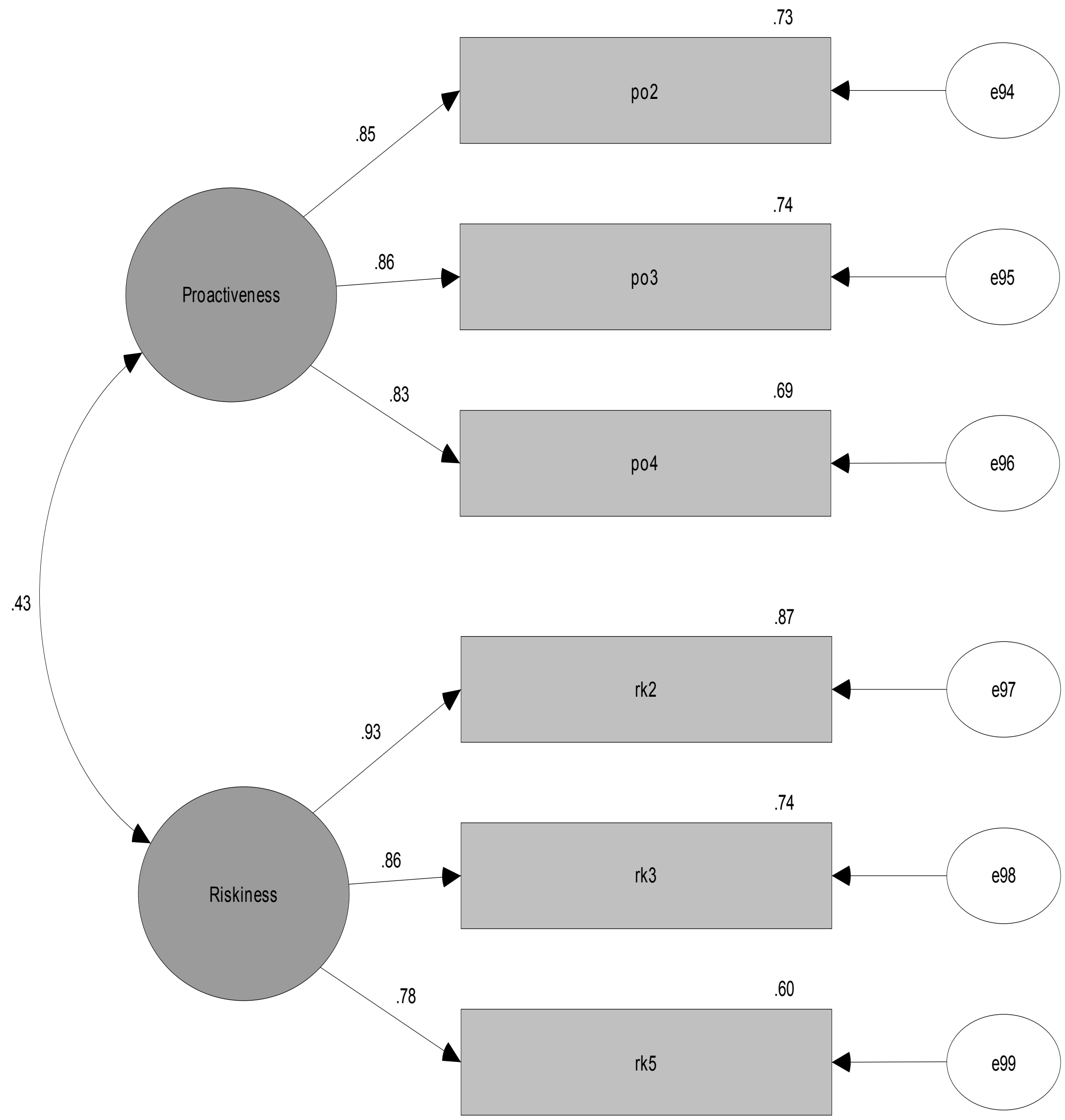


Figure 63: standardized first orders CFA organisation strategy constructs.

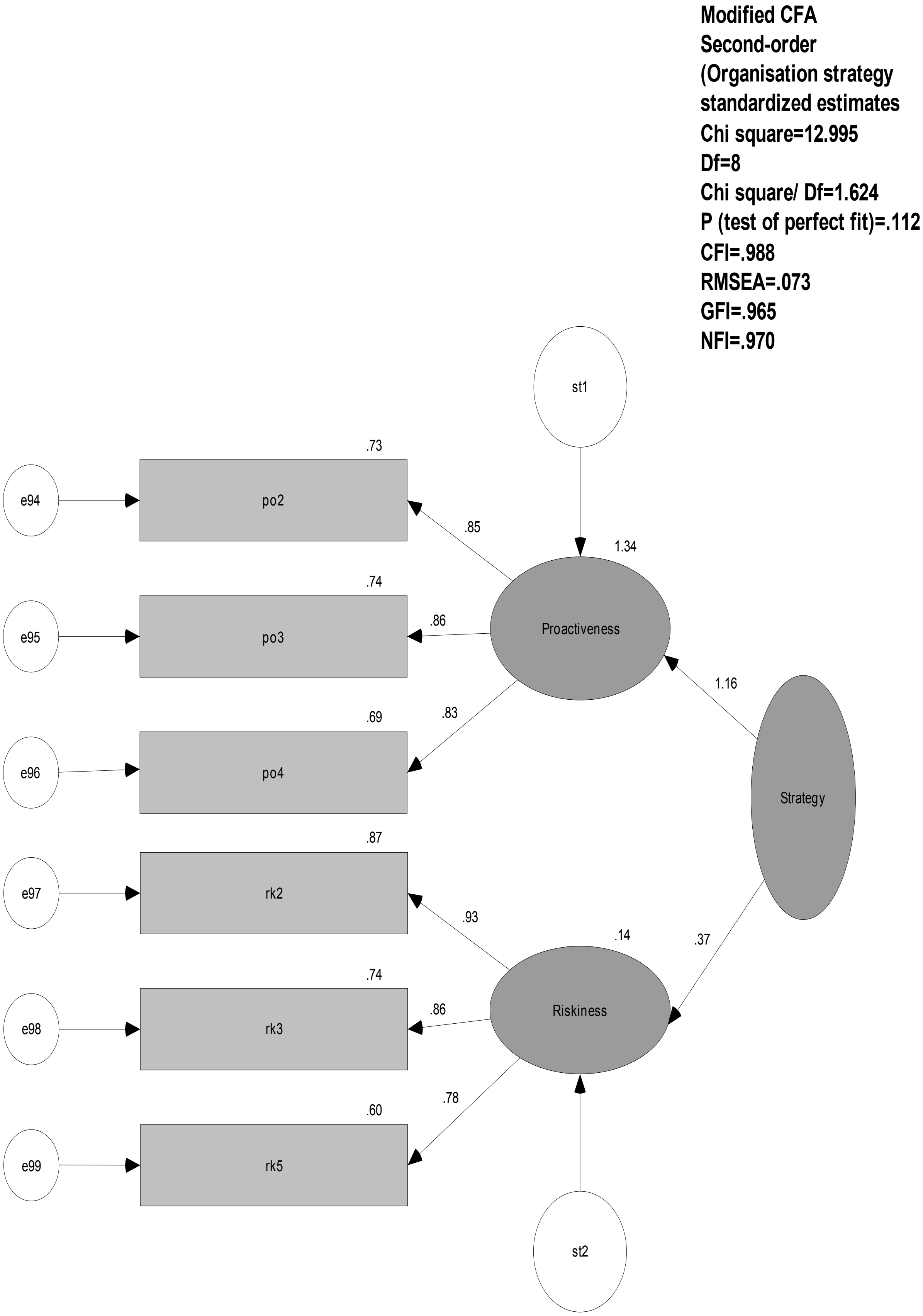


Figure 64: standardized second orders CFA organisation strategy constructs.

5.2.10 Reporting construct validity (Environment uncertainty)

The three sub-constructs that constitute "*Environment uncertainty*" construct proven to be problematic throughout this analysis, first with lack of Cronbach's Alpha reliability of "Hostility construct" and then low AVE of "Dynamism construct" and at CFA the "Heterogeneity construct" is under identified with DF value of zero **Figure (65),** therefore the "*Environment uncertainty*" construct will be excluded from any further analysis.

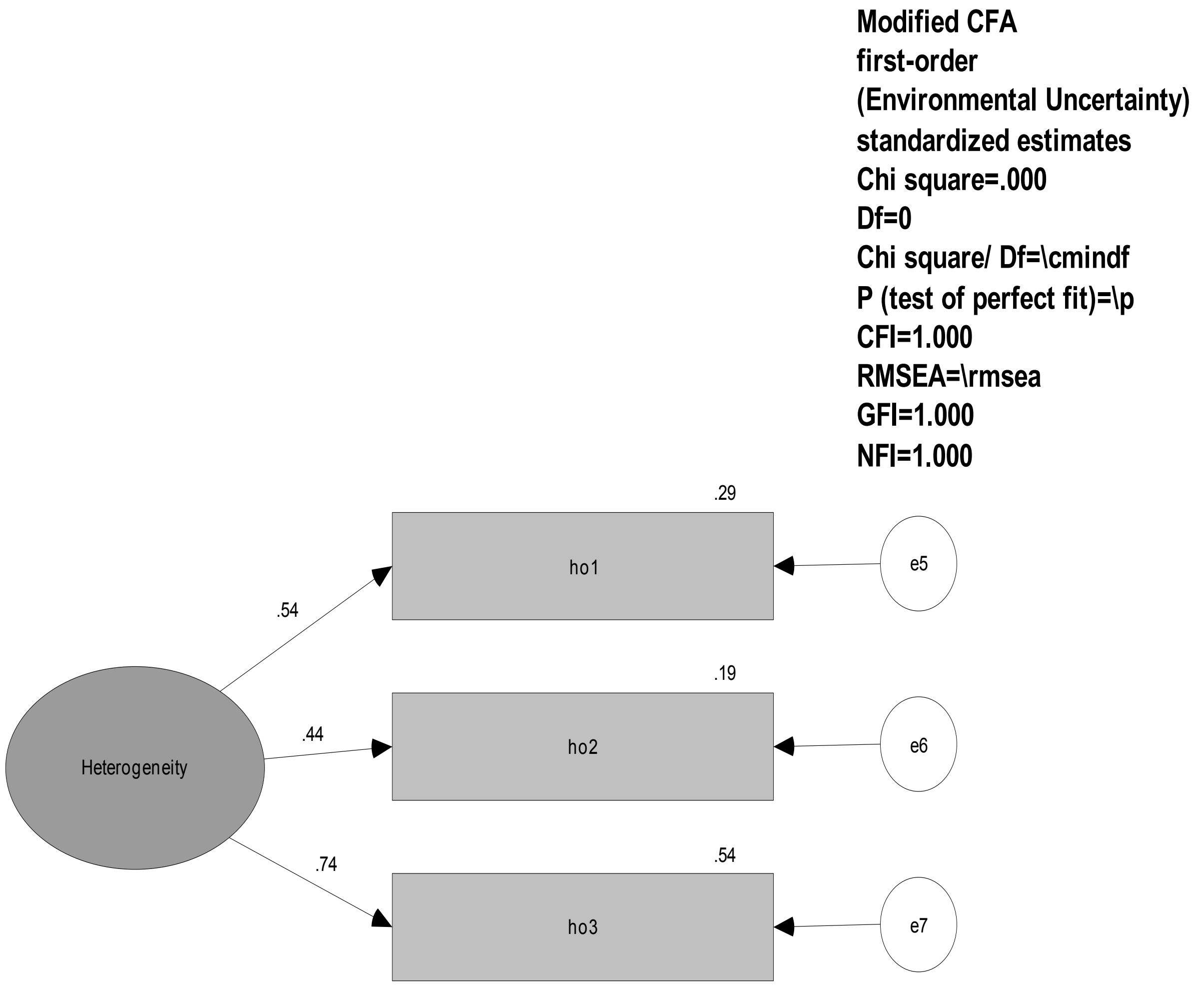


Figure 65: Construct measurement environment uncertainty- heterogeneity.

5.2.11 The structural model (Path analysis and hypothesis testing)

Having assessed the measurement models, this chapter reports the data analysis of all of the structural models and tests the research hypotheses presented in the methodology chapter. One hundred and seventeen cases will be included in the analysis. The CFA was able to achieve validated measurement models of 17 latent variables (three in SISP success, six in SISP process and eight in SISP context) and seven second-order latent variables (one in SISP success, three in SISP process and 3 in SISP context) with 56 observed variables. The next step is to establish a path analysis model to assess the causal structure and investigate the relationship among the measurement variables according to the contingency theory of information systems.

5.2.12 The hypothesised path models

The hypothesised structural models were specified according to contingency theory, which was discussed in the literature review and methodology chapters. In this analysis, measurement models will be converted to form the structural model and test the hypothesised relationship. The hypotheses suggest that the organisational context (contingent variables) have direct and indirect effects on SISP success (effectiveness); the indirect effect is predicted by SISP process, which is in turn predicted by the organisational context and predicts SISP success. In order to obtain insight into the statistical data and satisfy the research hypotheses, the model has been specified and identified to provide a more in-depth understanding of causal relationship between the SISP context, SISP process and SISP success constructs. The SISP context set is specified as a multidimensional construct containing reflective indicators and formative dimensions (Petter *et al.*, 2007). The SISP context construct is then identified as a predictor of multiple-mediation constructs of the SISP process and SISP success constructs (see methodology chapter and Preacher *et al.,* 2008). The SISP success construct is specified as a multidimensional construct identified by formative measurement dimensions; this is the dependent variable.

The full path analysis model is the substance of the measurement model specified and identified in the path model according to the theory; if the fit indices are not satisfactory than the model will be modified on the bases of the p-value and t-value of the regression weights as well as the modification indices (Byrne, 2010),;the direct and indirect effect of the complete path model will be estimated by applying the bootstrapping technique to a sample of 2,000 to magnify the effect of the path model and test the research hypotheses. The following path model analysis represents the full research model.

5.2.13 Path Analysis: SISP Context→SISP Process→ SISP Success

The relationship between SISP context, SISP process and SISP success represents the path analysis of the full model. SISP context represents the validated organisational context and is specified as a formative multidimensional construct identified through reflective indicators of multi-mediators in the SISP process. In turn, SISP context predicts SISP success directly or indirectly through the SISP process. This is similar in type to the model found in SISP research by Henry *et al.* (2008).

5.2.14 Improving the initial model

The initial model fit was reasonably acceptable; however, the M.I showed that the formative organisational structure was causing a greater discrepancy on the overall model fit, and the regression weight of both 'formalisation' and the strategic orientation 'pro-activeness' had multi-collinearity and insignificant regression weight with the SISP contexts of competing and collaborative leadership orientations. Based on the specification of SISP context as formative construct, insignificant construct dimensions should logically be omitted through the process of model improvement in line with the theory and the nature of this study. The following organisational context constructs will be excluded from the final path analysis model: formalisation, pro-activeness, competing and collaborate. Furthermore, the model normality item AN8 and construct SISP flow are also omitted as they show high kurtosis values above the recommended 1.96, where the model achieved a multivariate kurtosis value of 1.78, meaning that non-normality did not exist in the model. All of the other constructs in SISP process and SISP success remained unaltered.

5.2.15 The improved final model's goodness of fit indices

An examination of the GOF indices showed improvement compared with the original structural model. The results of the fit indices are presented in Figure (66). There was acceptable model fit to the data; with a sample size of 117 and 20 indicators in the model, it is very unlikely that the p-value would be insignificant, as is the case with most relatively small sample research. This is discussed in the methodology chapter. The fit indices reported in the full path analysis are RMSEA=0.056 and CFI=0.94.

5.2.16 The full Path analysis model

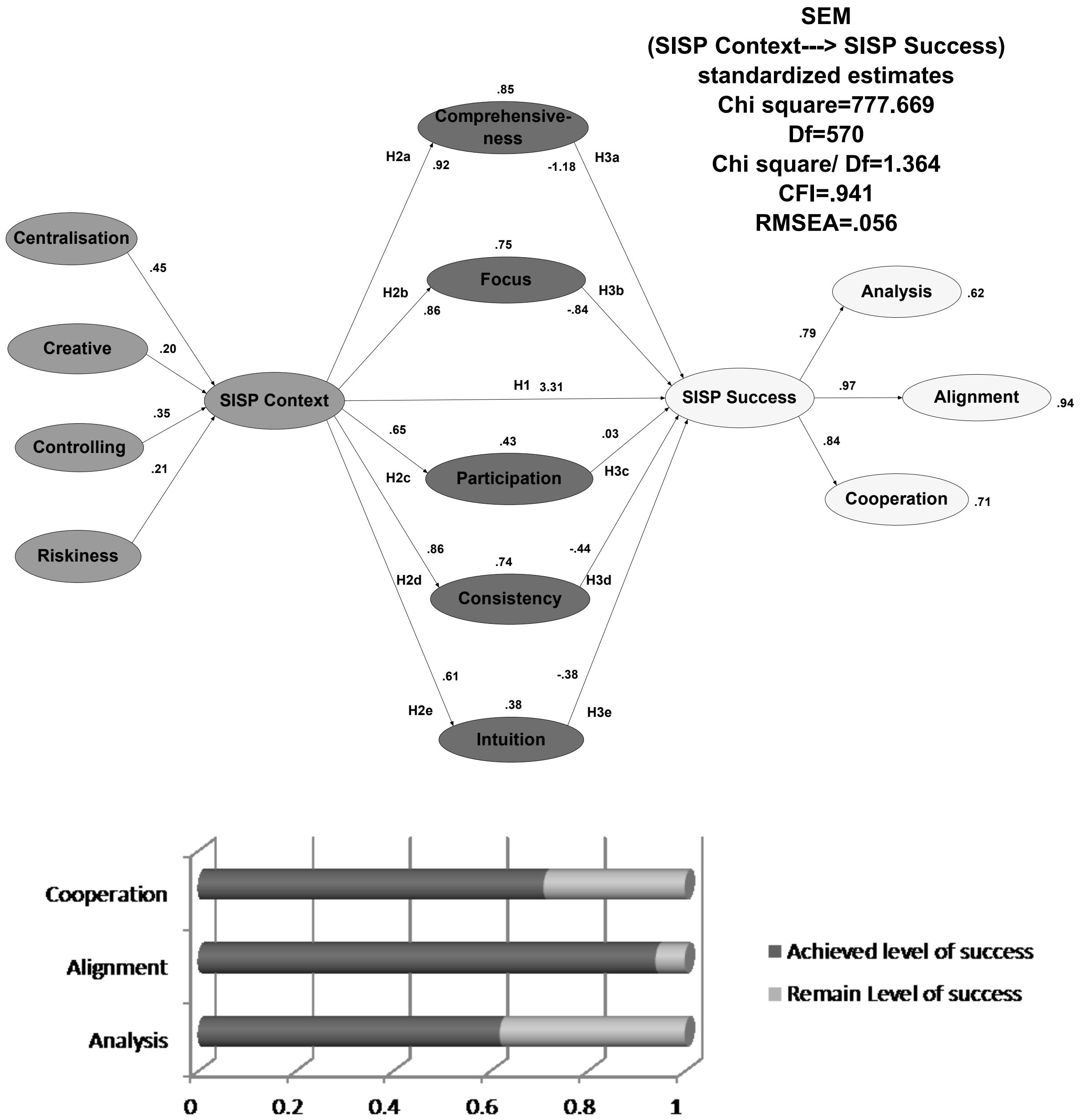


Figure 66: Research full path model.

The SEM path analysis model represented in the above figure is the research proposed full model, and the table below presenting the full model variables.

Table 54: path analysis modelvariables.			
Path Analysis Variables			
SISP Context			
Centralisation organisation structure	**Item**	**Mean**	**SD**
Extent to which decisions on new capital investment are centralized	Sc1	2.85	1.031
Extent to which decisions on new products are centralized	Sc2	2.95	1.041
Extent to which decisions on new customer groups are centralized	Sc3	2.97	0.885
Creative leadership orientation	**Item**	**Mean**	**SD**
Our organisation is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks	Cr1	2.81	1.137
Our management style in the organisation is characterized by individual risk taking, innovation, freedom, and uniqueness	Cr3	2.75	1.174
Our organisation emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued	Cr5	2.88	1.247
Controlling Leadership orientation	**Item**	**Mean**	**SD**
Our leadership in the organisation is generally considered to exemplify coordinating, organizing, or smooth-running efficiency	Ct2	3.14	1.252
Our management style in the organisation is characterized by security of employment, conformity, predictability, and stability in relationships	Ct3	3.32	1.222
Our organisation emphasizes performance and stability. Efficiency, control, and smooth operations are important	Ct4	3.15	1.142
Riskiness in organisation strategic orientation	**Item**	**Mean**	**SD**
Degree to which the organisation does not adopt a conservative view when making major decisions	Rk2	3.29	1.211
Degree to which the organisation does not approve projects on a "stage-by-stage" basis rather than with "blanket" approval	Rk3	3.44	1.094
Degree to which the organisation operation generally followed the "trial and error" paths	Rk5	3.52	1.157
SISP Processes			
Comprehensiveness	**Item**	**Mean**	**SD**
Before a decision is made, each possible course of action is thoroughly evaluated	Rc2	2.97	1.196
There is little trial and error in our strategic decision process	Rc4	3.12	1.146
We will delay decisions until we are sure that all alternatives have been evaluated	Rc5	2.94	1.154
Focus	**Item**	**Mean**	**SD**
The primary focus of IS planning is controlling cost through extensive budgeting	Ro1	3.26	.709
In our IS planning process we encourage creativity and idea generation over control	Ro2	2.85	1.154
Our IS planning process is tightly integrated with the firm's normal financial planning or capital budgeting routine	Ro5	3.06	1.036
Participation	**Item**	**Mean**	**SD**
Top management are actively involved in strategic IS planning	Ap1	2.61	1.017
Our process for strategic IS planning includes numerous participants	Ap3	2.69	1.070
Consistency	**Item**	**Mean**	**SD**
We frequently schedule face-to-face meetings to discuss strategic planning issues	Ac4	2.93	1.112
We formally plan for information systems as the need arises	Ac5	2.99	1.171
Intuition	**Item**	**Mean**	**SD**
We rely on personal judgment when planning for Information Systems	Pi1	3.21	.990
We depend on our gut feeling when planning for Information Systems	Pi2	3.32	.868
We emphasize past experience when planning for Information Systems	Pi3	3.09	.841
SISP Success			
Analysis	**Item**	**Mean**	**SD**
Monitoring of internal business needs and the capability of IS to meet those needs	An5	2.93	.878
Maintaining an understanding of changing organisational processes and procedures	An6	2.84	.982
Alignment	**Item**	**Mean**	**SD**
Understanding the strategic priorities of top management	Al1	2.36	1.078
Aligning IS strategies with the strategic plan of the organisation	Al2	2.66	.939
Adapting the goals/objectives of IS to changing goals/objectives of the organisation	Al3	2.31	1.141
Maintaining a mutual understanding with top management on the role of IS in supporting strategy	Al4	2.66	1.001
Identifying IT-related opportunities to support the strategic direction of the firm	Al5	2.44	1.177
Educating top management on the strategic importance of IT	Al6	2.62	1.128
Cooperation	**Item**	**Mean**	**SD**
Achieve a general level of agreement regarding the risks/trade-offs among systems projects	Co2	2.63	1.119
Establish a uniform basis for prioritizing projects	Co3	2.62	1.135
Maintaining open lines of communication with other departments	Co4	2.67	1.067

The above tables represent the model constructs and their dimensional items. Overall, there are 96 variables in the model, 36 of which are observed variables and 60 unobserved variables, while 50 are exogenous variables and 46 are endogenous ones. The unobserved exogenous variables include all the measurement error and disturbance. All are set to be correlated to cause unobserved endogenous variables of SISP context. The rest of all the latent variables shown in the model above are endogenous variables.

5.2.17 Testing the research model hypothesis

When testing the research hypothesis, the SEM path analysis statistics taken into the account are the models' over all fit and each direct effect of the path models' standardised regression weight (the regression weight can have a positive or negative value), the critical ratio for the regression weight (t-value) and the level of significance for regression weight, as well as the indirect effect of each standardised regression weight and the level of significance of that regression weight. Path analysis is considered significant when the probability of obtaining a critical ratio ≥1.96 is ≤0.05 significant with a 90% confidence level, which means significantly different from zero at the given percentage. The indirect effect was calculated using the bootstrap method for 2,000 samples; the bootstrap approximation method was conducted by constructing two-sided percentile-based confidence intervals at 90%.

Table 55: full model standardized direct regression weights.

Regression Path			Standardized Weights (Path)	Sig of C.R (T value)
Focus	<---	SISP Context	0.864	5.813***
Comprehensive-ness	<---	SISP Context	0.920	6.162***
Participation	<---	SISP Context	0.655	4.912***
Consistency	<---	SISP Context	0.862	6.189***
Intuition	<---	SISP Context	0.613	4.592***
SISP Success	<---	Comprehensive-ness	-1.180	-2.084*
SISP Success	<---	Focus	-.843	-2.688*
SISP Success	<---	Participation	.029	.259
SISP Success	<---	Consistency	-.437	-1.592
SISP Success	<---	Intuition	-.378	-3.072**
SISP Success	<---	SISP Context	3.314	3.233**

P^{*}= ≤0.05, P^{**}=≤0.01, P^{***}=≤0.001

The table above represent the full model standardised direct regression weights. There are two insignificant direct effects of SISP process (participation, consistency) on SISP success. There are three negative effects of SISP process (comprehensiveness and focus) on SISP success; the rest have positive effects at different levels of significance. The following table explain each direct and indirect effect of the hypothesised research model and whether the hypothesis should be accepted or rejected.

5.2.18 Research hypotheses result

H1: SISP context has direct and indirect effect on perceived SISP Success

Direct effect of SISP Context on SISP Success			**Standardized Weights**	**Sig of C.R (T value)**	**Status**
SISP Success	<---	SISP Context	3.314	3.233**	Accepted

P^{*}= ≤0.05, P^{**}=≤0.01, P^{***}=≤0.001

Indirect effect of "Riskiness strategy" on SISP Success			**Standardized Weights**	**Status**
SISP Success	←/----[5]	Riskiness	0.188**	Accepted
Cooperation	←/----	Riskiness	0.158**	Accepted
Alignment	←/----	Riskiness	0.182**	Accepted
Analysis	←/----	Riskiness	0.148**	Accepted

P^{*}= ≤0.05, P^{**}=≤0.01, P^{***}=≤0.001

Indirect effect of "Controlling leadership style" on SISP Success			**Standardized Weights**	**Status**
SISP Success	←/----	Controlling	0.321***	Accepted
Cooperation	←/----	Controlling	0.271***	Accepted
Alignment	←/----	Controlling	0.312***	Accepted
Analysis	←/----	Controlling	0.254***	Accepted

P^{*}= ≤0.05, P^{**}=≤0.01, P^{***}=≤0.001

Indirect effect of "Creative leadership style" on SISP Success			**Standardized Weights**	**Status**
SISP Success	←/----	Creative	0.185**	Accepted
Cooperation	←/----	Creative	0.156***	Accepted
Alignment	←/----	Creative	0.180**	Accepted
Analysis	←/----	Creative	0.146**	Accepted

P^{*}= ≤0.05, P^{**}=≤0.01, P^{***}=≤0.001

Indirect effect of "Centralisation structure" on SISP Success			**Standardized Weights**	**Status**
SISP Success	←/----	Centralisation	0.406***	Accepted
Cooperation	←/----	Centralisation	0.343***	Accepted
Alignment	←/----	Centralisation	0.394***	Accepted
Analysis	←/----	Centralisation	0.321***	Accepted

P^{*}= ≤0.05, P^{**}=≤0.01, P^{***}=≤0.001

H2: SISP context has direct effect on perceived SISP processes

			H No	**Standardized Weights**	**Sig of C.R (T value)**	**Status**
Comprehensive-ness	<---	SISP Context	H2a	0.920	6.162***	Accepted
Focus	<---	SISP Context	H2b	0.864	5.813***	Accepted
Participation	<---	SISP Context	H2c	0.655	4.912***	Accepted
Consistency	<---	SISP Context	H2d	0.862	6.189***	Accepted
Intuition	<---	SISP Context	H2e	0.613	4.592***	Accepted

P^{*}= ≤0.05, P^{**}=≤0.01, P^{***}=≤0.001

H3: SISP processes has direct effect on perceived SISP success

			H No	**Standardized Weights**	**Sig of C.R (T value)**	**Status**
SISP Success	<---	Comprehensive-ness	H3a	-1.180	-2.084*	Accepted
SISP Success	<---	Focus	H3b	-.843	-2.688*	Accepted
SISP Success	<---	Participation	H3c	.029	.259	Rejected
SISP Success	<---	Consistency	H3d	-.437	-1.592	Rejected
SISP Success	<---	Intuition	H3e	-.378	-3.072**	Accepted

P^{*}= ≤0.05, P^{**}=≤0.01, P^{***}=≤0.001

Table 56: research hypotheses result.

[5] Indirect regression path

5.2.19 Emerging path models for further discussion

The following models represent different construct relationships. These validated constructs will be put together to investigate what effect they have on each other in the light of the contingency theory of IS. In addition, they will further test Grover's (2005) assumption that rationality in SISP process has the most effect on SISP success. Thus, the author has modelled the rationality, adaptability and intuition stages separately to see the different effect of each stage on SISP success, in addition to the effect of different leadership style in SISP processes, and finally test the organisational context and its effect on both SISP success and SISP process. Each model has acceptable fit indices and a table represents the standardised regression weights and the significance of CR (t-value) to test the relationship effect and the strength of the path model. In the first three models, there is a bar chart showing the degree of success represented by its squared multiple correlations (SMC), where for example 'SMC' estimates the predictors of 'analysis' to explain 65% of its variance. In other words, the error variance of success is approximately 35% of the success variance.

5.2.20 SISP Processes →SISP Success

Direct effect of SISP Processes Rationality on SISP Success			Standardized Weights	Sig of C.R (T value)	Status
SISP Success	<---	SISP Processes Rationality	0.702	5.794***	Accepted

*P**= ≤0.05, *P***=≤0.01, *P****=≤0.001

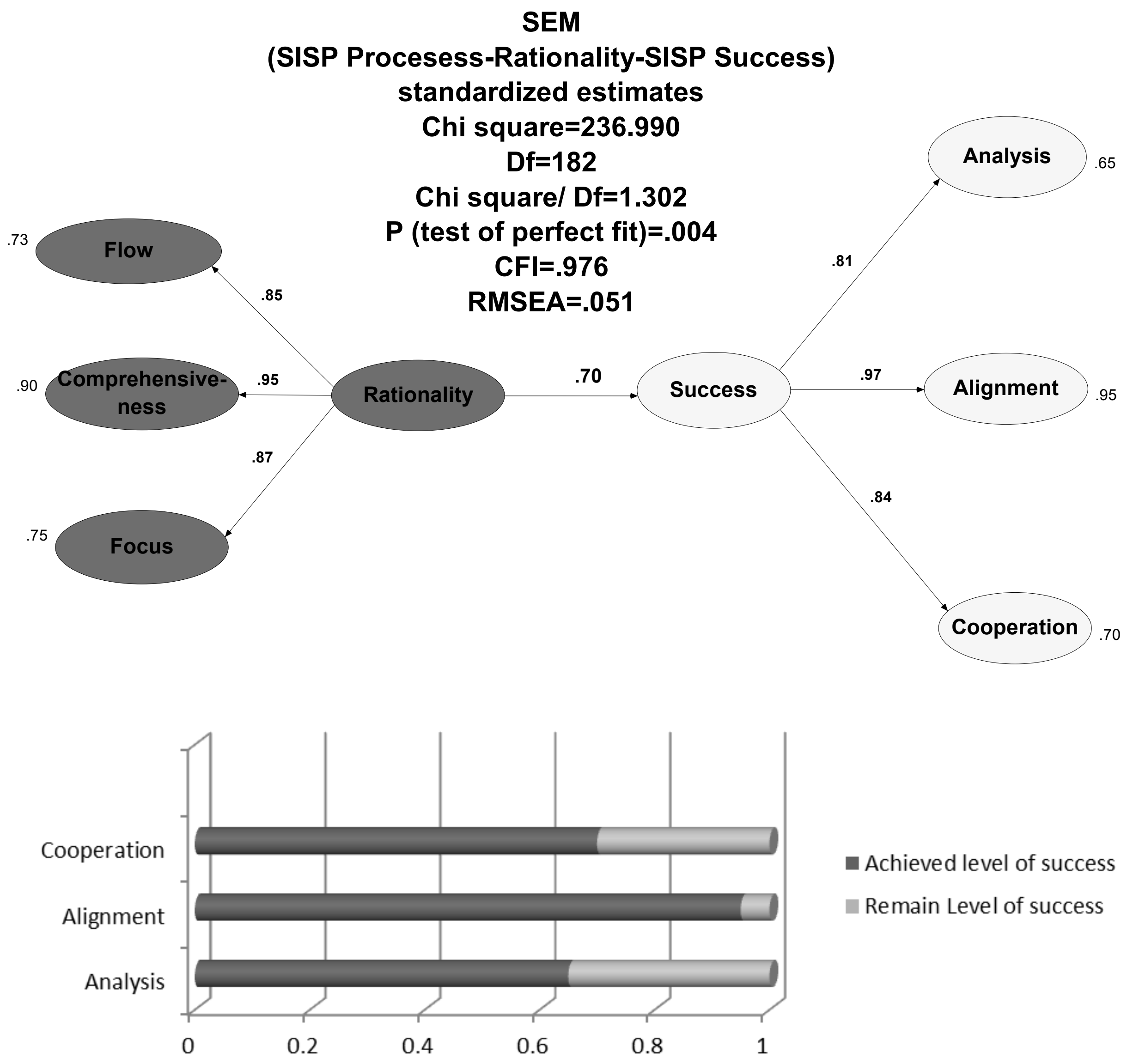
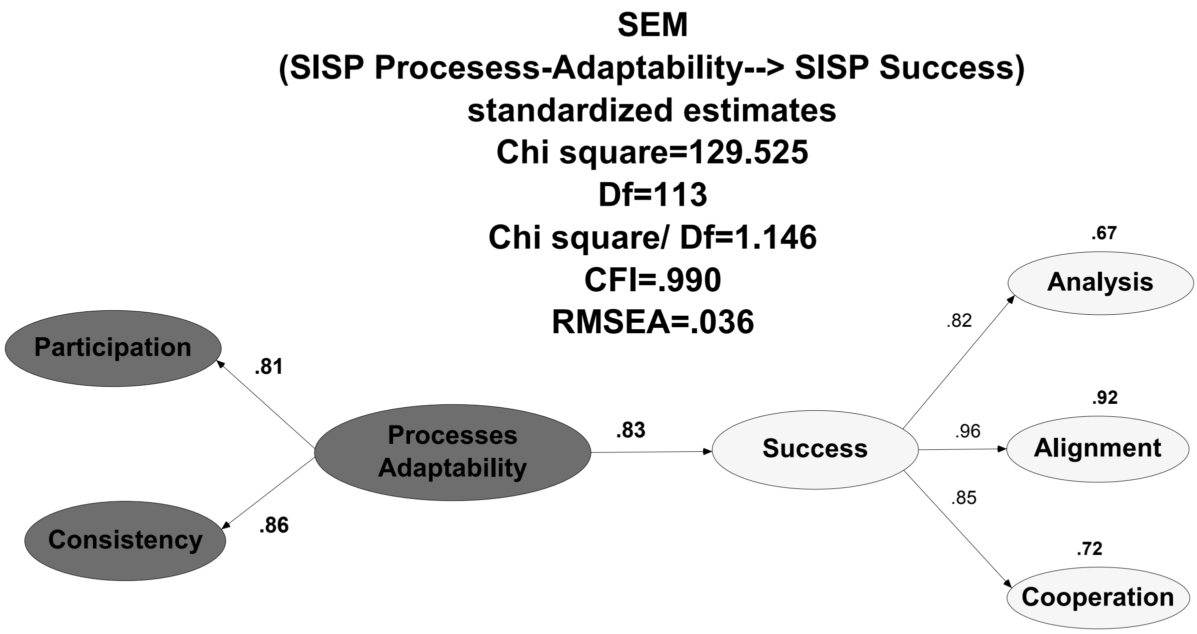


Figure 67: SISP processes→SISP success model.

5.2.21 SISP Adoptability→SISP Success

Direct effect of SISP Processes Adaptability on SISP Success			Standardized Weights	Sig of C.R (T value)	Status
SISP Success	<---	SISP Processes Adaptability	0.831	5.728***	Accepted

*P**= ≤0.05, *P***=≤0.01, *P****=≤0.001



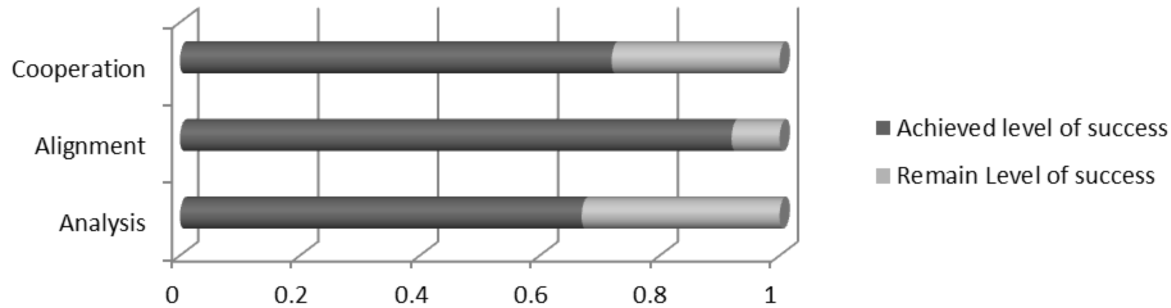
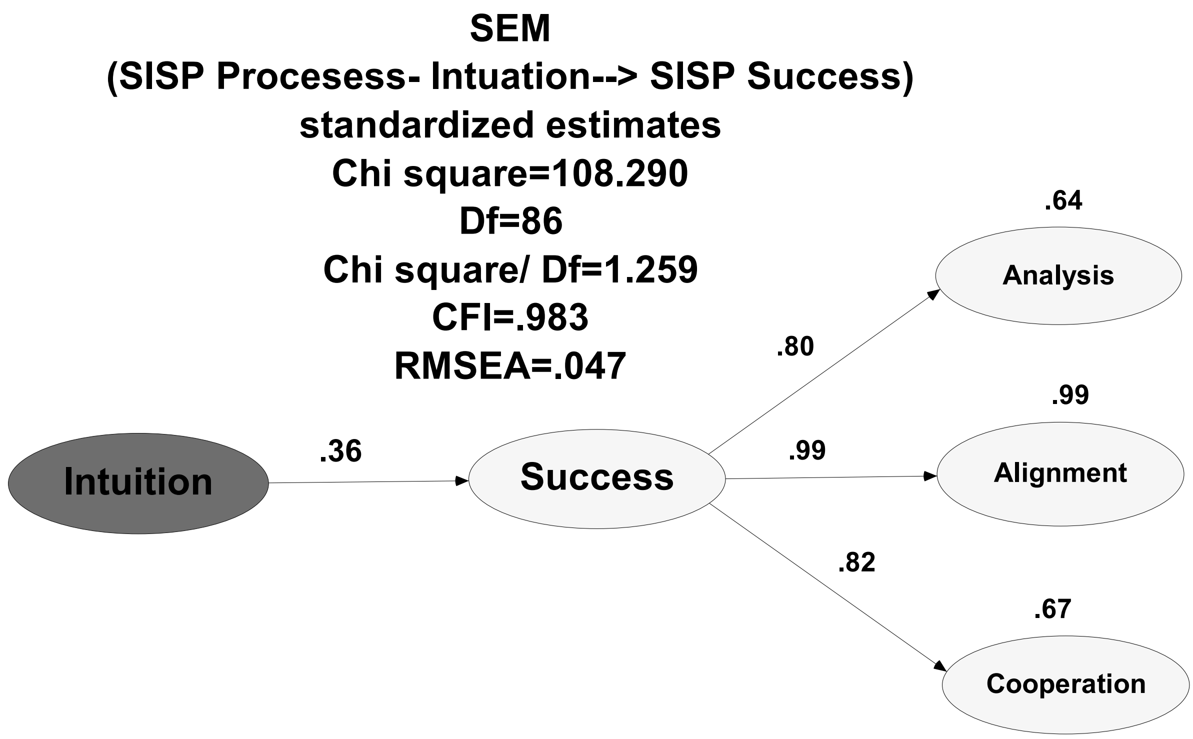


Figure 68: SISP adoptability→SISP success model.

5.2.22 Processes Intuition -→SISP Success

Direct effect of SISP Processes Intuition on SISP Success			Standardized Weights	Sig of C.R (T value)	Status
SISP Success	<---	SISP Processes Intuition	0.362	3.312***	Accepted

*P**= ≤0.05, *P***=≤0.01, *P****=≤0.001



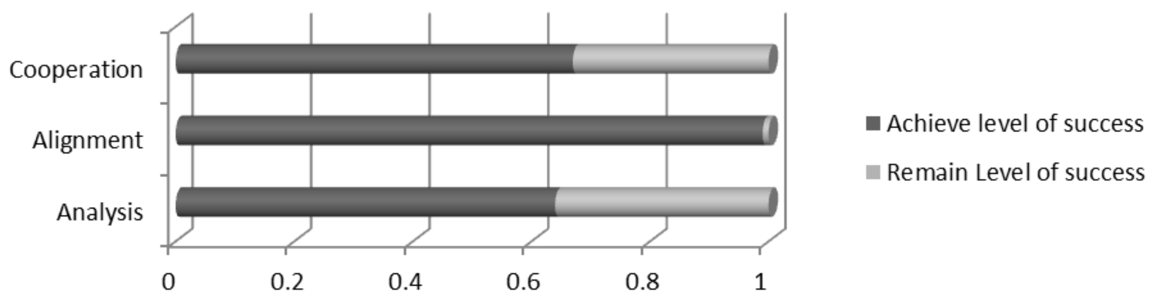
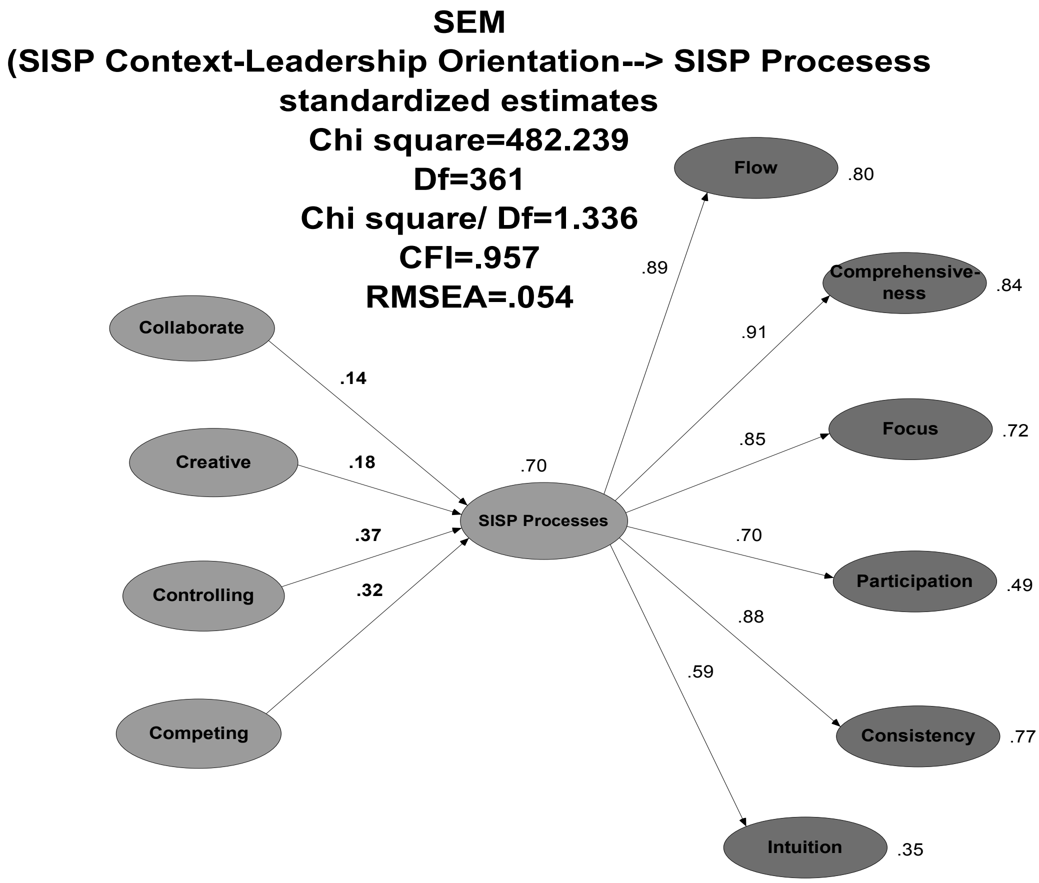


Figure 69: intuition -→SISP success model.

5.2.23 Leadership orientation→SISP Processes

Direct effect of Leadership orientation on SISP Processes			Standardized Weights	Sig of C.R (T value)	Status
SISP Processes	<---	Collaborate	0.142	1.527	Rejected
SISP Processes	<---	Creative	0.181	1.843	Rejected
SISP Processes	<---	Controlling	0.373	3.789***	Accepted
SISP Processes	<---	Competing	0.322	2.875**	Accepted

*P**= ≤0.05, *P***=≤0.01, *P****=≤0.001



Standardized Indirect Effects	Competing	Controlling
Intuition	0.191*	0.222***
Consistency	0.283*	0.328***
Participation	0.224*	0.260***
Focus	0.273*	0.316***
Comprehensive-_ness	0.294*	0.341***
Flow	0.287*	0.333***

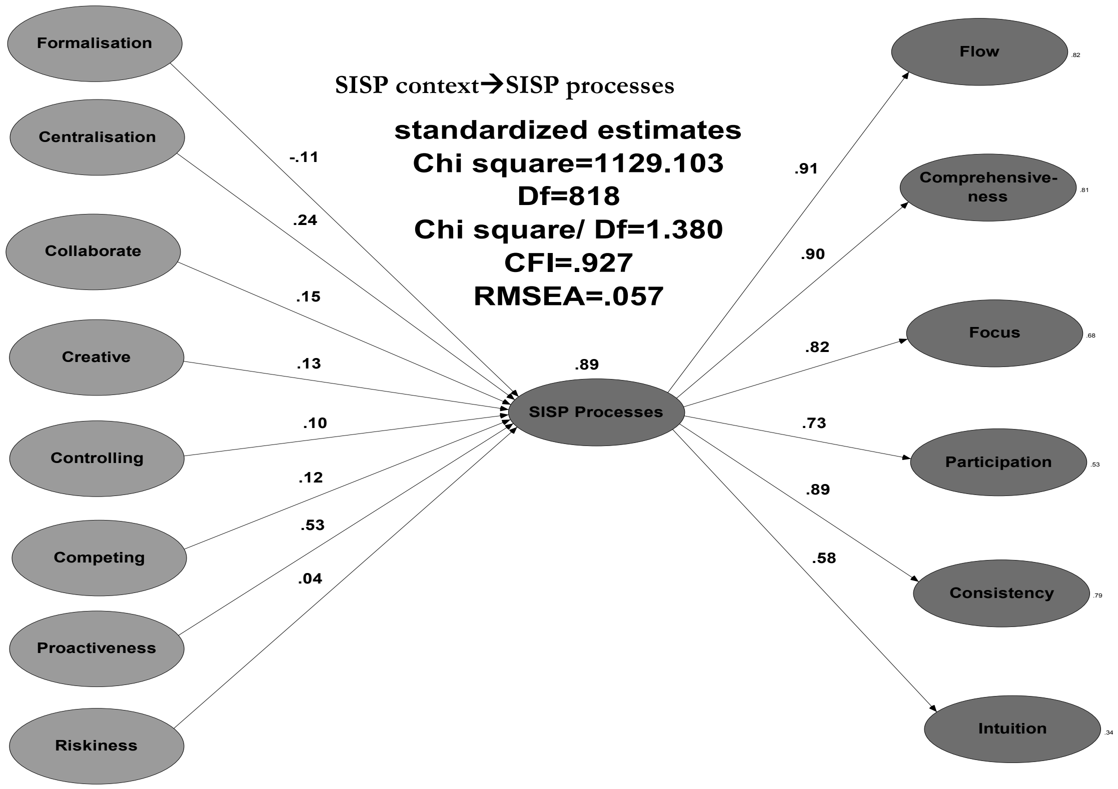
*P**= ≤0.05, *P***=≤0.01, *P****=≤0.001

Figure 70: leadership orientation→SISP processes.

5.2.24 SISP Context→SISP Processes

Direct effect of SISP Context on SISP Processes			Standardized Weights	Sig of C.R (T value)	Status
SISP Processes	<---	Formalisation	-.110	-.850	Rejected
SISP Processes	<---	Centralisation	.243	2.540*	Accepted
SISP Processes	<---	Collaborate	.150	2.073*	Accepted
SISP Processes	<---	Creative	.129	1.652	Rejected
SISP Processes	<---	Controlling	.104	1.275	Rejected
SISP Processes	<---	Competing	.122	1.280	Rejected
SISP Processes	<---	Proactiveness	.528	4.593***	Accepted
SISP Processes	<---	Riskiness	.044	.707	Rejected

*P**= ≤0.05, *P***=≤0.01, *P****=≤0.001



Standardized Indirect Effects	Proactiveness	Centralisation
Intuition	.308***	.142*
Consistency	.468***	.216*
Participation	.384***	.177*
Focus	.435***	.201*
Comprehensive-ness	.474***	.218*
Flow	.480***	.221*

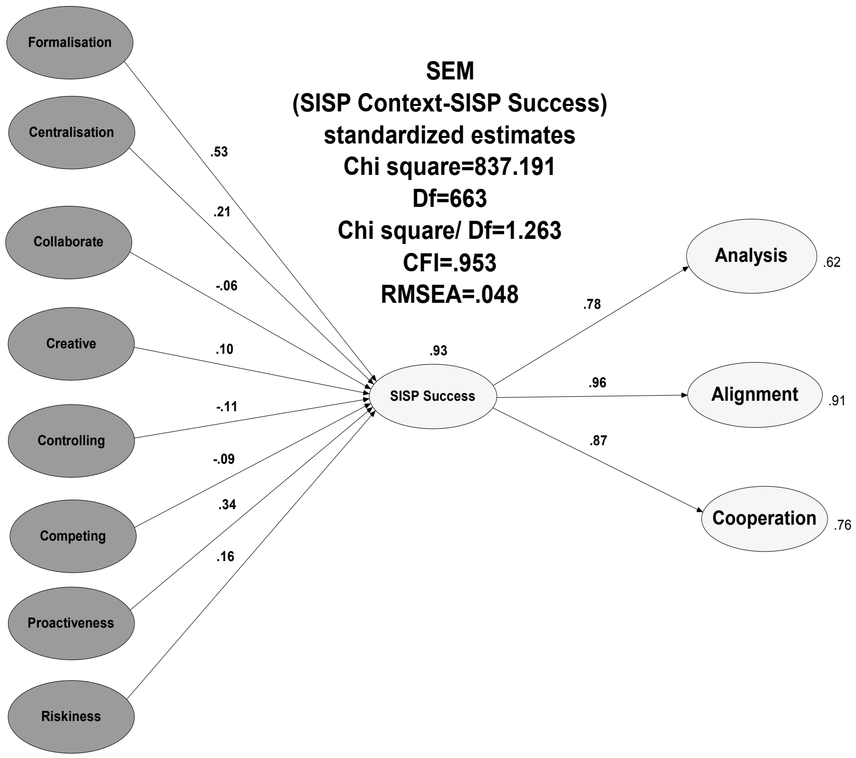
*P**= ≤0.05, *P***=≤0.01, *P****=≤0.001

Figure 71: SISP context→SISP processes.

5.2.25 SISP Context→SISP Success

Direct effect of SISP Context on SISP Success			Standardized Weights	Sig of C.R (T value)	Status
SISP Success	<---	Formalisation	.528	3.775***	Accepted
SISP Success	<---	Centralisation	.208	2.245*	Accepted
SISP Success	<---	Collaborate	-.062	-.905	Rejected
SISP Success	<---	Creative	.099	1.317	Rejected
SISP Success	<---	Controlling	-.106	-1.345	Rejected
SISP Success	<---	Competing	-.090	-.974	Rejected
SISP Success	<---	Proactiveness	.345	3.171**	Accepted
SISP Success	<---	Riskiness	.157	2.542*	Accepted

$P^{*}=\leq 0.05$, $P^{**}=\leq 0.01$, $P^{***}=\leq 0.001$



Standardized Indirect Effects SISP Context on SISP Success	Riskiness	Proactiveness	Formalisation
Cooperation	.136*	.300*	.459*
Alignment	.150*	.329*	.504*
Analysis	.123*	.271*	.414*

$P^{*}=\leq 0.05$, $P^{**}=\leq 0.01$, $P^{***}=\leq 0.001$

Figure 72: SISP context→SISP success.

5.3 Chapter five summary

This chapter included two sections: The first was the most important section, as it presented the data collection and initial analysis of the data. The author found this section to involve the most time, effort and resources. Through the rigid procedure applied to the research data collection process, the data collected were satisfactory both in their representation and quality. This allowed the research to carry on to the second section of data analysis, which represented the measurement model assessment followed by the structural model assessment. Section two of research analysis reported on the complete sample of 117 cases, the data analysis and validation of the measurement models of SISP success, SISP processes and SISP context, the adapted model generating approach and the components (latent and observed variables) in the initial model set to be modified and improved to fit the sampling data through separate measurement models. These will later be the components of the 'path analysis' structural model.

Through confirmatory factor analysis, the convergent, nomological and discriminant validity of each of the measurement constructs was established. Cronbach's reliability test was used for the initial sets of constructs in the EFA; in the CFA, each construct was tested for its AVE and CR. Consistent with the construct specification as stated in the operationalisation section, all the constructs were specified as reflective construct measurements. The CFA for these constructs resulted in 17 first-order latent variables (three in SISP success, six in SISP process and eight in SISP context), seven second-order latent variables (one in SISP success, three in SISP process and three in SISP context) and 56 observed variables overall. As previously discussed, reliability and convergent, discriminant and nomological validity of the measurement models need to be established before analysing structural models. By employing EFA followed by CFA, effective measurement constructs were established.

After the measurement models were validated, these measurements were then converted into a path analysis model representing the research hypotheses in order to achieve reliable fit models. Some of the construct dimensions were omitted, and the estimates from model fit to data were able to explain valid relationships. The result of the path analysis models will be discussed in detail in the following chapter.

Chapter Six: Discussion and Research Findings

6. Introduction

Previous chapters studied the relationships between SISP success, SISP process and SISP context from both the conceptual and empirical perspectives. The literature review identified the research constructs that compose SISP according to the contingency theory of information systems, which is represented as the conceptual framework that holds these constructs together. Chapter three described the research methodology; this chapter represents the solid foundation of the research. It was divided into two main sections: a general research methodology section and an SEM statistical methodology section. The methodology adopted in this research was represented in a model at the end of the chapter, which drew a roadmap for the remainder of the chapters to follow. Chapter four focused on the operationalisation of the research constructs; in this way, the researcher was able to select measurement items for all of the constructs and their variables for later use in exploring the relationship between constructs. Chapter five focused on research data analysis. The chapter was organised into two sections: the first reported on instrument refining and sample characteristics, with the second chapter reporting on measurement models and the structural model. The discussions in the present chapter are also grouped into two main sections: The first section reflects on the literature review, methodology and operationalisation, while the second discusses the research findings from the measurement models and the structural model.

6.1 Research methodology discussions

The research methodology part is the most important part of the research. In fact it's the core frame of that holds the research together. It is important to understand what the nature of the research is and what it does try to achieve. In this thesis was clear from the beginning that the research is testing a theory, so it is a confirmatory theory testing orientated research. The theory used in the research enquiry is very robust theory and this in itself a good start for the methodology to eliminate bias in the findings. Instrument development methodology and structural equation model ling (SEM) technique were companied in a research model to be used as quantitative based methodology consist a structural steps to follow from research model specification to the point where drawing a conclusion and recommendation is more clear and well-articulated, the model is represented in figure 30 page 138. The model also gives a very good guide to validation and data fitting into the developed structural model to give indications of direct and indirect effects of constructs on each other's. The difficulty of the research methodology can be sum-up in three different parts. First is how to develop the research model and the tools to collect data, second the data collection, and finally the analysis of the data according to the developed model. But overall learning curve of the methodology chapter is obtained, and that is how to develop a robust model and fit reliable data into this model to give readable and interpretable numbers to recognise relationships between different parts of the developed model. The learning curve of model development booth the theoretical and the statistical one went very well, however there were difficulty in data collection.

6.2 Discussions on measurement models

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed to analyse the measurement models in this research. Prior to their completion, a specification of such models was required; therefore, literature regarding the measurement models was methodically reviewed in chapter three. The following discourse outlines the findings for each measurement model.

6.2.1 SISP context measurement models

The SISP context is the most difficult to measure of the three constructs constituting the research model. This difficulty emerges from the complexity of SISP context construct measurement. The researcher's aim is to develop an SISP context construct that can be built into a path model. The multidimensional, multi-item sub-constructs of the SISP context make it impossible to measure the construct as one block. Thus, each sub-construct has to be measured separately for validation as a reflective construct. The SISP context as a new construct was developed in this study to represent the SISP context in Libyan organisations, measured as a second-order formative construct, for the following reasons:

1. All the reflective sub-constructs that constitute the key theoretical facets for SISP context are conceptually divergent (not interchangeable);
2. The sub-constructs that form concept variance of SISP context; their addition or deletion moderates the construct's conceptual domain (Jarvis *et al.*, 2003; MacKenzie *et al.*, 2005; Petter, 2007; Bongsik *et al.*, 2011).
3. The reflective sub-constructs shape the formative construct of SISP context. This means that the sub-constructs cause the formative construct of SISP context, and that the construct is fully derived by its measurement.

The measurement error (disturbance) is at the construct level, meaning that part of the construct variance is not explained by the sub-constructs (MacKenzie *et al.*, 2005; Coltman *et al.*, 2008). Due to the direction of causality of formative models, high correlation between indicators is not expected. However, dropping an indicator would be similar to dropping part of the construct, and should not be done once an indicator has been verified and validated as part of a construct (Bollen *et al.*, 1991; Jarvis *et al.*, 2003; MacKenzie *et al.*, 2005; Petter, 2007). A construct with three reflective measures allows for the covariances among the measures to be used to estimate the factor loading. In this case, the reflective construct can be considered to be identified by its own indicators. Conversely, a necessary condition for identification of a formative construct is to produce more than one structural relationship (Maccallum *et al.*, 1993; Jarvis *et al.*, 2003). In this study, the formative construct of SISP context was identified in the structural relations of directing paths to two or more unrelated reflective constructs (Jarvis *et al.*, 2003). Those reflective constructs are the SISP process and SISP success constructs. The requirements for construct identification apply to first- as well as second-order formative constructs (Bongsik *et al.*, 2011). As stated above, in this research, each dimension of the SISP context construct was measured separately as first- and second-order reflective constructs after the loading was confirmed and validity was checked. Then, all of the valid constructs were demonstrated to constitute the sub-construct of the second-order formative construct of SISP context. In the following discussion, each construct will be discussed separately from the theoretical and empirical perspectives.

I. Organisational environment

At a theoretical level, chapters two and four studied the concept of the organisational environment. The organisational environment, or the construct of environmental uncertainty, has been previously measured and validated by a number of scholars, and its effect on SISP process and success has been confirmed (Lederer, 2006; Bechor *et al.*, 2009). This reflective construct has three sub-dimensions: dynamism, heterogeneity and hostility environment. Each one of these dimensions was discussed in detail in chapter four.

At an empirical level, the three sub-constructs that constitute the construct of 'environmental uncertainty*'* proved to be problematic throughout the analysis, firstly with a lack of Cronbach's alpha reliability of the 'hostility' sub-construct, and secondly with the low AVE of the 'dynamism' sub-construct. Thirdly, in the CFA, the 'heterogeneity' sub-construct was under identified with a DF value of zero. Although environmental uncertainty is a very important contingent sub-construct of SISP context within the theory, the result from the analysis suggests that the sub-construct is not valid in the sample study. This clearly violates the theory, and would suggest that in the sample study, managers did not give enough attention to the analysis of the environment when planning for information systems. Reading the environment of an organisation before planning, and during the plan, for information systems is important for the duration and robustness of such a plan. Good environmental analysis helps in understanding the variance in information between business environment uncertainty and information needed when proceeding with information system plans.

II. Organisational culture/leadership orientation

At a theoretical level, the focus in this research is on the intermediate level of organisational culture, which covers values and beliefs that translate into action (Schein, 1985). The literature indicates that firms which show different corporate cultures intend to utilise different levels and complexities of strategic planning (Veliyath, 1993). Terry *et al.* (2006) suggested that an interesting contingent variable that a researcher could explore is organisational culture and its effect on SISP. One may argue that the SISP process itself represents a degree of leadership orientation, as senior management plays a vital role in the management and manipulation of such a process (McAleese, 2004). There is a strong body of opinion suggesting that an organisational culture can be consciously designed and manipulated by the leadership (Weiling Ke, 2008). Thus, leadership values are core constituents of organisational culture (Quinn, 2006). As a result, leadership of senior management is necessary for SISP success (Weiling, 2008). This study focuses on an intermediate level of organisational culture, measured by the leadership orientation of an executive IT advisory committee that includes CIOs and CEOs. This research thereby pursues a model that can assess leadership orientation rather than organisational culture in general. Different quantitative models to assess organisational culture have been reviewed; these include organisational culture inventory (OCI) by Cooke and Rousseau (1988), Hofstede's culture assessment model (Hofstede, 1990), and the competing values model (CVM) of leadership orientation by Quinn and Kimberly (1984). Both the OCI and Hofstede models are found to be too complex for this research, as they require more than 100 items to measure organisational culture in general. Thus, this research applies the CVM of leadership orientation to measure leadership orientation.

A similar study was carried out by Juhani and Huisman (2007) to explore the association between organisational culture and the arrangement of systems development methodologies. They interpreted organisational culture in terms of CVM of leadership orientation, which has an impact on systems development methodologies. When the value of IT clashes with an organisation's culture, the situation calls for compromise, either with the rejection of the systems or the modification of the systems will so that they match the existing culture (Weiling, 2008). In short, the construct of leadership orientation (LSO) used in this study is a very well-established and pre-validated construct; in fact, the dimensions of LSO are the four factors that constitute the CVM of leadership. This construct has been thoroughly validated by its creators, Quinn and

Kimberly (1984), and the measurement items used are those from their book published in 2006. Juhani and Huisman (2007) used the same measurement in their paper published in *MIS Quarterly*.

Chapter two and Chapter four reviewed the concept of organisational culture and leadership orientation. The dynamic nature of culture and multidimensionality of leadership orientation requires an effective and a robust model that can comprehend the different types of leadership orientation within different organisations. The four dimensions of leadership in CVF are systematically identified as imperative aspects of leadership orientation: creative, collaborative, controlling and competing.

- The *collaborative leadership orientation* (flexibility and discretion vs. internal focus and integration) is primarily concerned with human relations and flexibility. Commitment, communication and development are its core value drivers. Effectiveness criteria include the development of human potential and participation.
- The *creative leadership orientation* (flexibility and discretion vs. external focus and differentiation) is entrepreneur transformation and vision value driven. The effectiveness criteria emphasis growth, resource acquisition, vision and adaptation to the external environment.
- The *competing leadership orientation* (stability and control vs. external focus and differentiation) is hard driven and competitor value motivated by goal achievement and profitability. The effectiveness criteria emphasise aggressive competition and customer focus.
- The *controlling leadership orientation* (stability and control vs. internal focus and integration) is coordinated, monitored and organised. It emphasises control, stability and efficiency, and its value is driven by efficiency, timeliness, consistency and uniformity. The effectiveness criteria emphasise control and efficiency with capable processes.

At an empirical level, confirmatory factor analysis of the leadership orientation construct (resulting in 13 items) supports the leadership orientation consisting of the above four factors. As illustrated in chapter five, the first- and second-order confirmatory analyses demonstrated that each of the four factors significantly load onto the leadership orientation sub-constructs. The analysis results indicated that each of the observed variables load significantly into their respective factors. The regression weights ranged from 0.74 to 0.89. All critical ratios (t-values) were significant at the 90% confidence level. The overall first-order model fit indices were as follows: chi square=66.456, DF=59, chi square/Df=1.126, P=0.236, CFI=0.993, RMSEA=0.033, GFI=0.924, NFI=0.938. The second-order model fit indices were as follows: chi square=80.219, DF=61, chi square/Df=1.315, P=0.050, CFI=0.981, RMSEA=0.052, GFI=0.910, NFI=0.926. This shows that the hypothesised measurement model of leadership orientation cannot be rejected, taking into consideration the complexity of the model and the small sample size. The CR and AVE are both over 0.7; thus the reliability of the leadership orientation is accepted. The analysis demonstrated that the research is able to validate the construct of leadership orientation with all of its sub-constructs in the sample size. This shows that all of the four types of leadership orientation do exist in the research sample size.

III. Organisational structure construct

At a theoretical level, chapters two and five reviewed the concept of organisational structure. The dynamic nature and multidimensionality of the organisational structure require an effective and a robust model that can comprehend the different types of structure within different organisations. The organisational structure is divided into four constructs; two are second-order constructs and the remaining two are first order. The fourth sub-dimension of the second-order construct of organisational structure is systematically identified as representing imperative aspects of organisational structure, and consists of centralisation, formalisation and integration.

- **Organisational structure:** This construct has three sub-dimensions, discussed in the following. *Centralisation*: Decision-making power is in the hands of a small number of individuals (King & Sabherwal, 1992; Daft, 1998). In addition, Parker (1995) stressed that in a more federalised organisation, employees at lower levels contribute less toward IS decisions compared to senior employees; thus, decisions may be perceived to be more politically motivated. *Formalisation:* The degree to which rules and procedures are clearly documented and made known to all employees (King & Sabherwal, 1992). *Integration:* The degree of planning in the organisation, which is important as it reflects on the SISP process and success constructs. This dimension was used by Sabherwal & King, 1992) and validated by Alan (2004).

- **Information system resources:** These are the planning resources available to the organisation when planning for information systems; planning resources fall under the structure dimension (King, 1988; Premkumar & King, 1994). Information systems planning resources can be viewed as three constructs (Newkirka & Albert, 2007). *Technical resources* focus on the particular information technologies, such as application software, systems software, hardware and network communications, whereas *personnel resources* focus on more people-oriented concerns, such as technical training, end-user computing, facilities and the personnel themselves (Mirchandani, 2004).The last element is *data security resources,* which focus on protecting the organisation from unwanted intrusion and recovering from such intrusion if and when it occurs (Anderson, 2002).

- **Size/Maturity:** Size/maturity measures size on the basis of the total revenue of the organisation, and maturity using the number of IS/IT employees and the budget dedicated to the IS/IT department (Pyburn, 1983; Carr, 2003).
- **Complexity:** The complexity dimension is used to assess factors such as the position held by the informer; organisational ownership; years of experience in the IS and nature of the organisation's business (Olson & Chervany, 1980).

At an empirical level, confirmatory factor analysis was performed for the organisational structure construct and information systems resources construct. The results showed that organisational structure orientation consists of two sub-constructs: formalisation and centralisation. The information systems resources construct was discarded due to the lack of consistency. The size/maturity and complexity factors were added to the survey, and the analysis was discussed in chapter five. Overall, and between formalisation and centralisation, eight items were achieved. All item loadings achieved values between 0.778 and 0.898, and all critical ratios (t-values) were significant at the 90% confidence level. As illustrated in chapter five, the first- and second-order confirmatory analysis demonstrated that each of the eight factors significantly loaded onto the organisational structure construct and its sub-constructs. The first- and second-order CFA achieved the same fit index of chi square=26.11, Df =19, chi square/Df =1.375, P=0.127, CFI=0.989, RMSEA=0.057, GFI=0.947 and NFI=0.961. The analysis demonstrated that the hypothesised measurement model of the organisational structure construct cannot be rejected, taking into consideration the complexity of the model and the sample size. However, the resources construct was rejected in the initial analysis of factor internal consistency. The factors that showed less importance to the executives in Libyan organisations could be of great important to SISP success in the long run. Previous studies have shown that factors such as planning horizontal integration and information systems resources may impact on SISP success in the long run (Brown, 2004; Mullins, 2005, Henry *et al.*, 2008). Taking these factors into consideration could add a great deal of inclusivity to the plan.

IV. Organisational strategy

At a theoretical level, chapter two and chapter five reviewed the concept of organisational strategy. The dynamic nature and multidimensionality of organisational strategy require an effective and robust model that can comprehend the different types of strategy organisation within different organisations. The six sub-dimensions in strategy organisation can be systematically identified as imperative aspects of strategy organisation. These sub-constructs are as follows: aggressiveness, analysis, defensiveness, futurity, pro-activeness and riskiness. Organisational strategy is an important factor in SISP study, as one of the main success criteria of SISP is the alignment between business objectives and information systems objectives. At an empirical level, the dimensions of futurity, defensiveness, analysis and aggressiveness were all discarded during the validation process of the consistency test, pre-test, EFA and CFA. The confirmatory factor analysis of the organisational strategy construct (resulting in 6 items) demonstrated that organisational strategy consists of just two dimensions: pro-activeness and riskiness. As illustrated in chapter five, both the first- and second-order confirmatory analyses demonstrated that each of the six factors significantly load onto both of the organisational strategy sub-constructs. The overall first-order and second order model fit indices were as follows: chi-square=12.995, chi-square/degree of freedom=1.6, degree of freedom=8, CFI=0.988, RMSEA=0.073, GFI=0.965 and NFI=0.970. However, not all of the sub-dimensions of organisational strategy are validated. The analysis showed that the hypothesised measurement model of organisational strategy cannot be rejected, taking into consideration the complexity of the model and the sample size. Two main strategies exist at this sample size: pro-activeness and riskiness. These two strategic orientations may explain the current economic situation in Libya, where the economy is experiencing a growing stage; it is therefore natural to favour pro-activeness and riskiness strategies over other strategies.

6.2.2 SISP success measurement model

At a theoretical level, chapters two and four reviewed the concept of SISP success. The SISP success construct is the most established of all the constructs used in the research model. It is validated by a number of researchers in different geographic areas. The dynamic nature of SISP success and its multidimensionality require that effective SISP success cannot simply be measured by financial measurement. Instead, SISP outcomes can be viewed as the degree of achievement of SISP objectives, which are based on the positive relationship between the value added from IS when it is successfully planned with strong performance. Therefore, SISP objectives should be extended to increase organisational performance and competitive advantage (Raghunathan & Raghunathan, 1994; Krell & Matook, 2009). Consequently, four sub-constructs were identified as imperative aspects of SISP success; three represent SISP objectives—these are planning alignment, planning cooperation and planning analysis (the other sub-construct is that of planning capabilities). The SISP success construct dimension and sub-dimensions have been discussed in previous chapters.

At an empirical level, confirmatory factor analysis of the SISP success construct (resulting in 12 items) showed that the SISP success construct consists of three sub-constructs: planning alignment, planning cooperation and planning analysis. The covariance and correlation estimates showed negative values and an insignificant p-value, suggesting that exogenous variables or 'capabilities' are the cause of this negativity. Thus, the nomological validity assumption is violated, which suggests that there is significance for covariance and positive correlation between the constructs in the measurement model. Therefore, the 'capabilities' sub-construct was excluded from further analysis. As illustrated in chapter five, the first- and second-order confirmatory analysis demonstrated that each of the three factors significantly load onto the SISP success construct. The first- and second-order confirmatory factor analysis results indicated that each of the observed variables loads significantly to its respective factors. The overall first- and second-order model fit indices are as follows: chi-square= 61.3, chi-square/DF=1.203, DF=51, P=0.152, GFI=0.924, RMSEA=0.42, NFI=0.951 and CFI=0.991. This result indicates that the model is fit, confirming that the hypothesised measurement model of SISP success cannot be rejected taking into consideration the complexity of the model and the sample size. Although the 'improvement in capability' sub-construct is an important construct to measure SISP success (Segars & Henry, 2007; Segars & Grover, 2005), it remains invalid in this sample study; nevertheless sub-constructs of the fulfilment of the key objectives measuring SISP success were validated. This could explain the initial stage of planning maturity in Libyan organisations and the basic economic status, where managers at this stage want to focus more on fulfilment of key objectives of SISP and ignore its capabilities. This could impact on planning sustainability in the long run, where business environments are changing and thus the key objectives might change also. Therefore, when there is a measurement for planning capability put in place, there will be more flexibility and a better understanding of any required change to meet the objectives of the planning.

6.2.3 SISP process measurement model

At a theoretical level, chapters two and four reviewed the concept of SISP process. This construct might be the most difficult to measure out of all the model constructs. This study adopted the most recent and valid measurements available and was also able to develop a new measurement dimension for the construct. The dynamic nature of SISP process and the multidimensionality of the measurement model require more effort than the previous measurements. The theoretical model suggests that the SISP process exists in two different stages: the rationality stage and the adaptability stage. However, in the theoretical development of the construct, this research adds a new dimension to be reviewed, as a new stage represents the initial stages of the SISP process (Luftman, 2000; Grover, 2005). Consequently, seven dimensions were identified as imperative aspects of the SISP process construct. Through extensive analysis of both the strategic management and SISP sequential research flow, Grover *et al.* (1998) identified six important SISP process dimensions, and illustrated that they are 'robust in describing SISP design extending far beyond methodologically-based and less-generalizable descriptions of IS planning while complementing and further structuring general "approaches based descriptions"' (Grover, 2005). The dimensions are labelled as comprehensiveness, flow, formalisation, focus, participation and consistency. The six dimensions of the SISP process exhibit elements of both rationality (high comprehensiveness, high formalisation, top-down flow, control focus) and adaptability (wide participation, high consistency) in the decision-making process. The new dimension added to the SISP process is 'intuition', representing the initial stage in the SISP process. The theory suggests that when the decision-making process moves into rationality, the better the chance of SISP success.

Adaptability is the stage that comes before rationality; the research established that intuition is the first stage of SISP process but it does not contradict the rationality stage. In fact, it could complete the cycle of the SISP process in that when intuition is found to be higher, it means that the SISP process is moving toward the adaptability stage. When intuition is found to be lower in the SISP process it could mean that a more rational SISP process exists in an organisation. A discussion of each stage of the SISP process can be found in the operationalisation chapter.

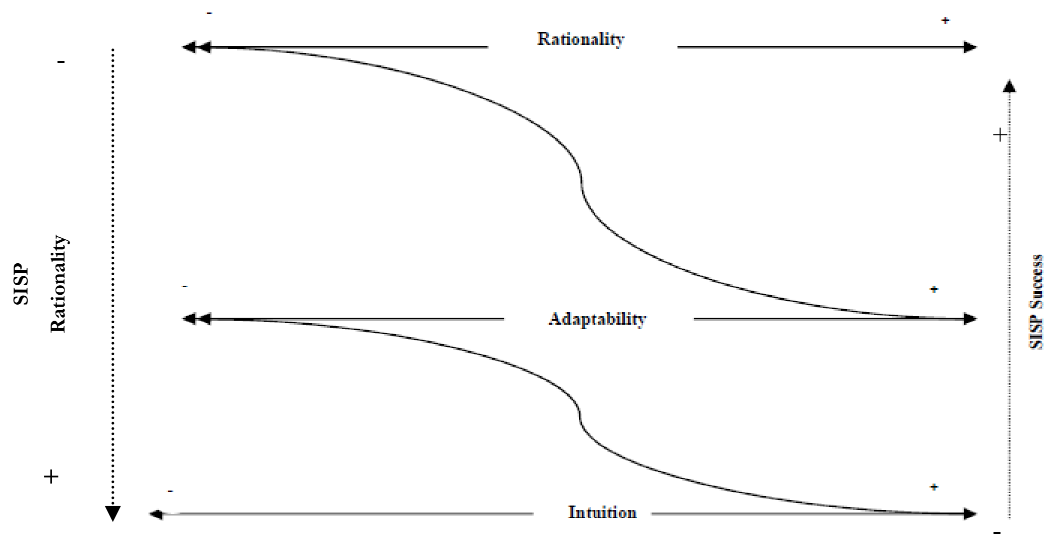


Figure 73: The proposed dynamic SISP process stages of growth

At an empirical level, after following the validity process for this construct and particularly the confirmatory factor analysis of the SISP process construct (resulting in 17 items); the evidence shows that the SISP process consists of six sub-constructs. As illustrated in chapter four, the first- and second-order confirmatory analysis demonstrated that each of the six factors significantly load onto the SISP process construct. The first- and second-order confirmatory factor analysis results indicate that each of the observed variables loads significantly to its respective factors. The first-order results are as follows: chi square=111.57, DF=104, chi square/DF =1.073, P=0.288, CFI=0.99, RMSEA=0.025, GFI=0.904 and NFI=0.941. The second-order results are as follows: chi square=151.76, DF=113, chi square/DF=1.343, P=0.009, CFI=0.978, RMSEA=0.054, GFI=0.873 and NFI=0.919. This shows that the hypothesised measurement model of the SISP process cannot be rejected, taking into consideration the complexity of the model and the sample size. Only one sub-dimension of the SISP process was excluded because of the high discrepancy values in the model. All reliability tests were performed for the sub-constructs. In addition, the analysis utilised CFA for the three stages that make up the SISP stages of growth, showing that all sub-constructs load very well into their perspective constructs, with good fit indices.

6.3 Findings from the measurement models

The measurement models are the components that make up the overall research model, and are divided into two main parts. The first part is theoretical: Here, the construct's measurement items have been theoretically agreed upon its. All of the constructs used in this study have been validated by previous studies in different geographic areas. Hence, all of the constructs are theory driven, meaning that they represent the theory used in this study. Following the construct operationalization, the theoretical constructs emerged in chapter six to represent the components of the theory applied in the research. After following the instrument development methodology (as discussed in chapter three), the researcher began with the construct operationalisation, and finished with EFA and CFA. All contracts were validated at the empirical level of the analysis. Some of the constructs' dimensions and measurement items were omitted due to reliability and/or validity issues. Overall, the study succeeded in validating a six multidimensional, multi-item measurement constructs representing the SISP context, SISP process and SISP success amongst Libyan public and private organisations. Table (59) represents the constructs and their measurement dimensions, both at a theoretical and empirical level.

6.4 Discussion and findings from the path models

Statistical analysis of the path model was the last stage in this study. As represented in the methodology model in chapter three, this stage dealt with finding the fit between the different constructs in the research model. As mentioned above, the SISP context construct was set as a second-order formative construct and identified in structural relation through directing paths to two or more unrelated reflective constructs (Jarvis *et al.,* 2003), specifically the SISP process and SISP success constructs. Thus, the path analysis model consisted of three multidimensional constructs, where SISP context was set as a formative construct, SISP process was modelled as a multidimensional construct mediating SISP context and SISP success was set as a second-order reflective construct. The causal relationship of the model specification reflected on the relationship from the theory. This specification of the path analysis model will allow the researcher to test the theory and understand the affect constructs have on each other according to the research hypothesis. In addition to the main path model, representing the mathematical model of the theory, six more models emerged and these will be discussed below.

Table 57: Theoretical and Empirical Level of Construct Measurements

At the theoretical level	Items No	At the empirical level	Items No
Leadership orientation construct Collaborate, Creative, Controlling, Competing	23	**Leadership orientation construct** Collaborate, Creative, Controlling, Competing	13
Organisational environment construct Dynamism, Heterogeneity, Hostility	10	**Organisational environment construct** Heterogeneity	3
Organisation structure construct IS Resources, Integration, Formalisation, Centralisation	22	**Organisation structure construct** Formalisation, Centralisation	8
Business strategy construct Riskiness, Pro-activeness, Futurity, Defensiveness, Aggressiveness, Analysis	27	**Business strategy construct** Riskiness, Pro-activeness	6
SISP process construct Intuition, Consistency, Participation, Flow, Focus, Formalization, Comprehensiveness	32	**SISP process construct** Intuition, Consistency, Participation, Flow, Focus, Comprehensiveness	17
The SISP success construct Planning Analysis, Planning Cooperation, Planning Alignment, Planning Capabilities	30	**The SISP success construct** Planning Analysis, Planning Cooperation, Planning Alignment	9

6.5 The path model components and validity

The four sub-constructs that were validated in the path analysis model and which make up the SISP construct context prove to have both a direct and indirect impact on the way information systems planning is processed. The sub-constructs that constitute SISP context are as follows: centralisation, creativity, control and riskiness. These are in fact a mixture for the validated measurement models of SISP context, and each one represents a different measurement construct. However, overall these are the contexts that are important to managers planning for IS in Libyan organisations. Each of the SISP context sub-constructs that are found to have an impact on the research model are explained below.

- **Centralisation** is the sub-construct of organisational structure construct, which is part of SISP context. Three items are validated in this sub-construct; these items represent the extent to which new customer groups, new products and capital investment are centralised. The centralisation of decision making positively impacts on the SISP context construct, as when centralisation increases by one, the SISP context increases by 0.45%.

- **Creativity and control** are sub-constructs of the leadership orientation construct, which contains two more sub-dimensions. However, in the analysis these dimensions do not fit in the model. Creativity and control consist of three items each. The creative and controlling leadership positively impact on the SISP context construct, as when centralisation increases by one, the SISP context increases by 0.20% for creativity and 35% for control. The following table represents leader type, value drivers and the theory of effectiveness for each leadership orientation.

Table 58 The Most Effective Leadership Orientation

Leadership orientation: Control	Leadership orientation: Creativity
Leader type: Coordinator, Monitor, Organiser **Value drivers:** Efficiency, Timeliness, Consistency and Uniformity **Theory of effectiveness:** Control and efficiency with capable processes produces effectiveness.	**Leader type:** Innovator, Entrepreneur, Visionary **Value drivers:** Innovative outputs, Transformativeness, Agility **Theory of effectiveness:** Innovativeness, vision and new resources produce effectiveness.

- **Riskiness** is a sub-construct of the business strategy construct, which is validated in the construct measurement stage, with two sub-dimensions: riskiness and pro-activeness. Riskiness as the strategic orientation of an organisation is validated as a construct containing three different items. These items are the degree to which the organisation does not adopt a conservative view when making major decisions, the degree to which the organisation does not approve projects on a 'stage-by-stage' basis rather than with 'blanket' approval and the degree to which the organisation operation generally follows the 'trial and error' path.

The second construct is the SISP process. This was validated in the model with five sub-constructs that include 13 items, and is specified as a multi-mediation construct, mediating the effect of SISP context on SISP success. The last construct is SISP success. SISP success was validated in the path model with three sub-constructs that include 11 items. Overall, the model demonstrates acceptable fit indices, with the following values: chi square=777.66, DF=570, chi square/DF=1.36, CFI=0.941 and RMSEA= 0.056. In the following discussion, I will pinpoint the findings from the path analysis in the research model.

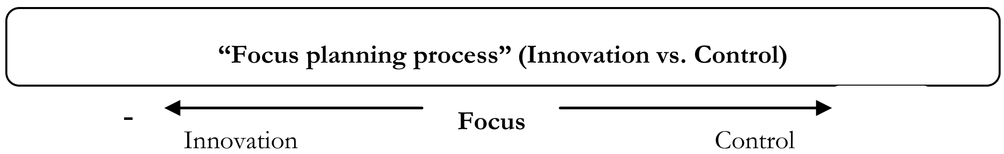
6.6 The path model analysis

- **SISP context→SISP process→SISP success**

The path model represents the statistical confirmation of the theory, where the constructs that constitute the theory are represented as structural equation modelling. In the model, the researcher tested the direct and indirect effect of SISP context on SISP success through SISP process. This model is the ultimate test for the research objectives and research hypothesis. Overall, SISP contexts are found to have a direct and indirect effect on SISP success. SISP contexts have a significant, direct impact on SISP success (regression weight=3.314, CR =3.23, p≤0.01). This result confirms the first hypothesis and suggests that when the context increases by one (centralisation in decision making, creative and controlling leadership orientation and riskiness strategy), the SISP success will increase by 3.31. Although SISP contexts have a significantly positive, direct impact on all of the five sub-constructs of the SISP process, only three SISP process sub-constructs have an impact on SISP success as mediators between SISP context and SISP success. These sub-constructs are comprehensiveness, focus and intuition. The findings related to causality suggest that all the mediation effects have a significantly negative impact on SISP success when they are caused by the SISP context. This finding is not a violation of the theory, but rather a new dimension in exploration of the theory, given the fact that all previous research suggests a positive relationship between SISP context and SISP success when mediated by SISP process. For instance, Grover (2005) suggested that when rationality in the SISP process increases, SISP success will increase; this applies to the adaptability stage of the SISP process as well. Although Grover did not examine this effect under the influence of different SISP contexts, he suggested that the examination of such a relationship is valuable for any future research. Since this model uses structural equation modelling, the theory of equations is valid to apply to the explanation of relationships. In addition, since the effects of SISP context on SISP process are positive, and the effects of SISP process on SISP success are negative, then we presume that all counter effects will be similar. If the effect of SISP context on the SISP process is negative, then the effect of SISP process on SISP success will be positive. In the following discussion, each significant relationship between SISP context, SISP process and SISP success is discussed separately, using the above mathematical logic in order to discuss the findings.

- **SISP context→ focus→ SISP success**

When SISP context increases by one → focus RW + 0.864, t-value= 5.813, P value ≤0.001, and when focus increases by one → SISP success RW - 0.843, t-value -2.688, P value ≤0.05.



This structural equation of the path analysis model suggests that when the SISP process focuses increases, moving toward a more controlling process under the influence of SISP context, SISP success will decrease as result. Thus, in this path analysis, there are two fundamental findings. The first is the existing finding that an increase in SISP context will result in an increase in SISP process focus toward a more controlled focus, in turn generating a decrease in SISP success. Second, when applying the theory of equations as mentioned above, the contradiction of the above relationship is viable when it comes to increasing SISP success; this suggests that a decrease in SISP context (less riskiness in organisational strategy, less creativity and control in leadership orientation and less centralisation in the organisational structure) has a negative effect on SISP process, which means that SISP process is more focused toward innovation rather than control. Therefore, it has a positive effect on SISP success.

This explanation is a solid finding; it does not conflict with the logic of the probability and theories of the equations, and explains the possible reaction for the SISP process in moving toward an innovative focus when decision-making in an organisation is not centralised and when there is less riskiness in organisational strategy, as well as when there is less creativity and control in leadership orientation. However, in the analysis of the current structural path and in the sample study, the results demonstrate that with the given SISP context and SISP process, the SISP shows a very high level of success; thus, the discussion above may be related to a change in future directions toward a more successful SISP.

- **SISP context→ comprehensive-ness → SISP success**

When SISP context increases by one → Comprehensiveness RW + 0.920, T value =6.162 P value ≤ 0.001, and when Comprehensiveness increases by one → SISP Success RW -1.180, T value =-2.084 P value ≤ 0.05

"Comprehensiveness Planning Process" (Comprehensive vs. Limited)

\- Limited ⟵ **Comprehensiveness** ⟶ Comprehensive +

This structural equation of the path analysis model suggests that when SISP process comprehensiveness increases, moving toward a more comprehensive process under the influence of SISP context, SISP success will decrease as result. Thus, in this path analysis, there are two fundamental findings. The first is the existing finding, suggesting that an increase in SISP context results in an increase in SISP process comprehensiveness, and the increase in SISP process toward a more comprehensive process results in a decrease in SISP success. Secondly, when applying the theory of equations, as mentioned above, the contradiction of the above relationship is viable in terms of increasing SISP success; this suggests that the decrease in SISP context (less riskiness in organisational strategy, less creativity and control in leadership orientation and less centralisation in the organisational structure) has a negative effect on SISP process comprehensiveness. This means that SISP process comprehensiveness is more limited rather than comprehensive, and therefore has a positive effect on SISP success. This explanation is a core finding, as it does not conflict with the logic of the probability, theories of equations or contingency theory, or with the nature of the SISP process. It explains a possible reaction for the SISP process to move toward a limited process when the decision making in an organisation is not centralised and when there is less riskiness in organisational strategy, as well as when there is less creativity and control in leadership orientation. However, in the analysis of the current structural path and in the sample study, the result demonstrated that with the given SISP context and SISP process, the SISP shows a very high level of success; thus, the discussion above may be related to a change in future directions toward a more successful SISP.`

- **SISP context→ intuition → SISP success**

When SISP context increases by one → Intuition RW + 0.613, T value= 4.592 P value ≤0.001, and when Intuition increase by one → SISP Success RW -0.378, T value =3.072 P value =≤0.01

"Intuition planning process" (Low vs. High)

- ← **Intuition** → +

Low High

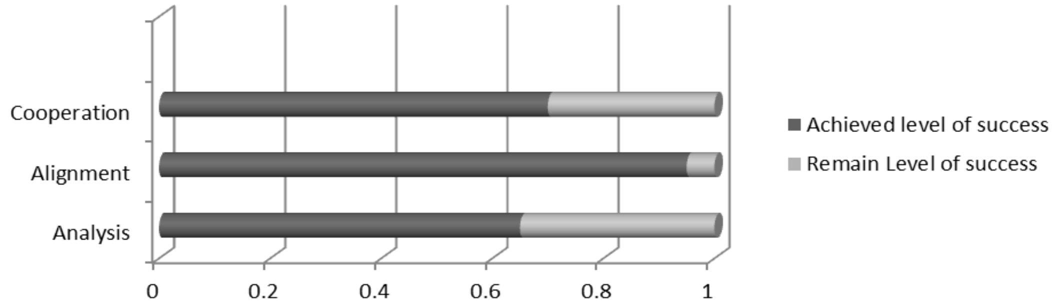
This structural equation of the path analysis model suggests that when SISP process intuition increases, moving toward a higher intuition process under the influence of SISP context, SISP success decreases as result. Thus, in this path analysis, there are two fundamental findings. The first is the existing finding, suggests that an increase in SISP context leads to an increase in SISP process intuition, and that an increase in SISP process intuition toward a higher intuition process is followed by a decrease in SISP success. Secondly, when applying the theory of equations as mentioned above, the contradiction of the above relationship is visible in terms of increasing SISP success; this suggests that the decrease in SISP context (less riskiness in organisational strategy, less creativity and control in leadership orientation and less centralisation in the organisational structure) has a negative effect on SISP process intuition, and therefore SISP process intuition will be lower, in turn having a positive effect on SISP success. This explanation is a key finding, as it does not conflict with the logic of the probability, theories of the equations or the contingency theory, or with the nature of the SISP process. It offers a possible explanation for why the SISP process would be lower when a decision in an organisation is not centralised, when there is less riskiness in organisational strategy and when there is less creativity and control in leadership orientation. However, in the analysis of the current structural path and in the sample study, the results demonstrated that with the given SISP context and SISP process, SISP shows a very high level of success; thus, the discussion above could be related to a change in the future direction of SISP toward a more successful one. All of the above discussions are very important in illustrating the current status of SISP process, and furthermore, a future direction for SISP context and SISP process in order to promote a more successful SISP.

6.7 Further path analysis emerging from the analysis

In the following models, the effects of different path analysis models have been tested.

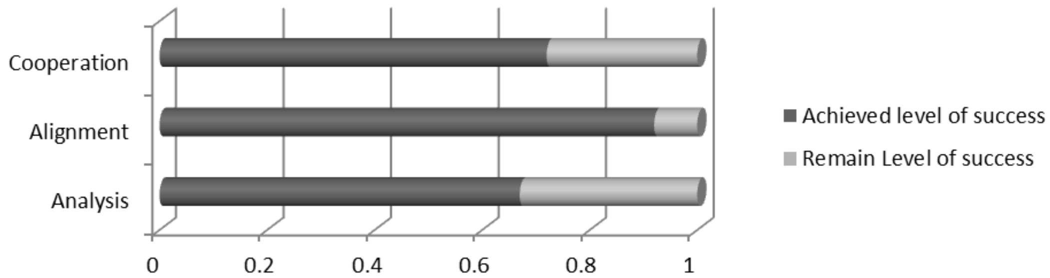
- **SISP processes rationality →SISP success**

This model demonstrates a good fit, at chi-square/df=1.302, P=0.004, CFI=0.976 and RMSEA=0.051. The rationality of the SISP process' impact on SISP success is significant at regression weight=0.702 and CR=5.79. A clearer picture is depicted in the SISP process rationality →SISP success path analysis in chapter five. The level of SISP success achieved in this path model, as shown below, reveals that rationality in the SISP process leads to a higher level of SISP success, with alignment as the highest indicator, followed by cooperation and then analysis.



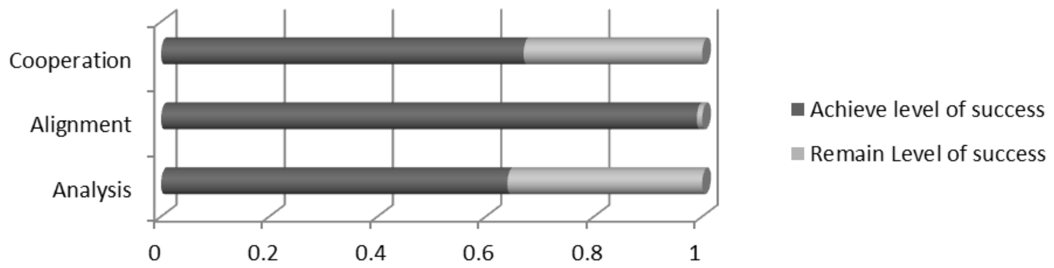
- **SISP processes adoptability →SISP success**

This model demonstrates a good fit, at chi square=108.29, DF=86, chi square/DF=1.259, CFI=0.983 and RMSEA=0.047. Intuition in the SISP process significantly affects SISP success, at regression weight=0. 362 and CR=3.312. An in-depth depiction of the SISP processes intuition →SISP success path analysis can be found in chapter five. The level of SISP success achieved in the path model shown below reveals that intuition in the SISP process leads to a higher level of SISP success, with alignment as the highest indicator, followed by cooperation and then analysis.



- **SISP processes intuition →SISP success**

This model demonstrates a good fit at: Chi square=108.29, DF=86, Chi square/ DF=1.259, CFI=0.983, RMSEA=0.047. Intuition in the SISP process impacts on SISP success significantly at: regression weight=0. 362, and CR=3.312. An in depth depiction of the SISP processes intuition →SISP success path analysis can be found in Chapter Five. The level of SISP success achieved in the path model shown below reveals that intuition in SISP process leads to a higher level of SISP success, with alignment as the highest indicator, followed by cooperation, and then analysis.



From the above discussion, one can conclude that the highest indicator of SISP success is alignment in all of the three models. Overall the highest success is achieved under the influence of both SISP process rationality and adaptability equally, but SISP process intuition also achieves a high level of success within the most important SISP success indicator: alignment. Thus, this result to some extent confirms the theory that as the SISP process moves toward rationality, the level of SISP success will be higher.

- **Leadership orientation →SISP process**

This model demonstrates a good fit, at chi square=482.23, DF=36, chi square/DF =1.33, CFI=0.957 and RMSEA=0.054. In this model, only two leadership orientations have a significant impact on SISP processes: controlling and competing. The impact of controlling on SISP process is significant at regression weight=0. 373 and CR=3.78, and competing is significant at regression weight=0. 322 and CR=2.87.

Standardized indirect effects	Competing	Controlling
Intuition	0.191*	0.222***
Consistency	0.283*	0.328***
Participation	0.224*	0.260***
Focus	0.273*	0.316***
Comprehensive-ness	0.294*	0.341***
Flow	0.287*	0.333***

$P^{*}= \leq 0.05$ $P^{**}= \leq 0.01$ $P^{***}= \leq 0.001$

The table above demonstrates the affect from both competing and controlling leadership orientations on each dimension of the SISP process. From the table it is clear that control has the most effect on SISP process.

- **SISP context →SISP processes**

This model demonstrates a good fit, at chi square=482.23, DF=36, chi square/DF=1.33, CFI=0.957 and RMSEA=0.054. When modeling all of the SISP context dimensions on the SISP process, only three SISP contexts have a significant effect on the process. Pro-activeness and centralisation have an indirect effect on SISP process sub-constructs. The table below shows the significance of this effect. From this analysis, one can conclude that pro-activeness as an organisational strategic orientation has the greatest effect on the SISP process. The highest effect is on the flow and the lowest is on intuition. This is also the case with centralisation in decision making in the SISP process.

Standardised indirect effects	Pro-activeness	Centralisation
Intuition	.308***	.142*
Consistency	.468***	.216*
Participation	.384***	.177*
Focus	.435***	.201*
Comprehensive-ness	.474***	.218*
Flow	.480***	.221*

*P**= ≤0.05, *P***=≤0.01, *P****=≤0.001

- **SISP Context→SISP success**

This model demonstrates a very good fit, at chi square=837.19, DF=66, chi square/DF=1.26, CFI=0.953 and RMSEA=0.048. In this model, all the SISP contexts are modelled against SISP success to find out which of these contexts has an impact on SISP success. The direct effect is from four sub-constructs, namely riskiness, pro-activeness, centralisation and formalisation. Formalisation has the highest impact on SISP success, followed by pro-activeness, riskiness and finally centralisation. Also demonstrated is the indirect effect of the sub-dimensions of SISP context on each sub-construct of SISP success

Standardised indirect effects SISP context on SISP success	Riskiness	Pro-activeness	Formalisation
Cooperation	.136*	.300*	.459*
Alignment	.150*	.329*	.504*
Analysis	.123*	.271*	.414*

*P**= ≤0.05, *P***=≤0.01, *P****=≤0.001

The indirect effect also shows that formalisation, pro-activeness and riskiness respectively have the highest impact on SISP success sub-constructs.

6.8 Further testing for the research constructs

The main model in this analysis satisfies the research objectives and fulfils the research hypothesis. With the further path model addressed above, one can add more depth to the analysis. The operationalised theory represented in the structural equation modelling can be explored in greater detail. Given the fact that this analysis uses multiple variables and the constructs are multidimensional, there is a great possibility to extend the analysis within the theory, to include testing the constructs on each other individually and from different dimensions. In addition, one may verify the relationship or undertake further enquiries by conducting qualitative research on the basis of the results obtained in the quantitative research.

6.9 Findings from the structural model

The data analysis in chapter five reported both direct and indirect links between SISP context, SISP process and SISP success. The research demonstrates that there is a strong direct and indirect relationship between these constructs. These findings confirm the theory in the research sample study. Therefore, the relationship between the validated constructs applies to both private and public organisations in Libya. Through this model, the research is able to identify which organisational context has an effect on the success of SISP both directly and indirectly. It also identifies the SISP process that exists in the sample study and which process is the most effective in producing successful SISP. These findings confirm the research hypothesis and fulfil the research objectives.

6.10 Overview of the fulfilment of study objectives

The overall research objective in this research was to produce a successful plan for selecting information system applications that are capable of leveraging competition and adding value to an organisation's overall performance. The study was able to fulfil the set of objectives initially developed to answer the research questions. These objectives have been met as follows:

- The study was able to apply the contingency theory of information systems to investigate the relationship between SISP context, SISP process and SISP success. As previously demonstrated, there are clear relationships between the factors in the theory and with the data. This relationship is clearly detailed in chapters five and six.
- It identified the SISP process stages of growth in the context of Libyan organisations; the SISP process in the sample study exists in all of the stages of growth, namely rationality (focus, comprehensiveness), adaptability (participation, consistency) and intuition. Although all of the sub-constructs of the SISP process are influenced by the SISP context, not all of them have a significant impact on SISP success. The SISP process sub-constructs that demonstrate an effect on SISP success are those rationality (comprehensiveness, focus) and intuition.
- It developed measurements and models to estimate SISP success in Libyan organisations. This objective has been achieved through the operationalisation in chapter four and statistical analysis in chapter five. The measurement models have been validated in a rigid process, followed by conversion into structural ones, in which they are modified for a better fit and more accurate result. This has been carried out in order to estimate the direct and

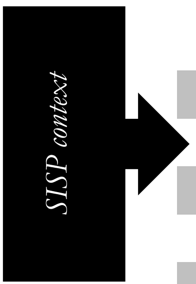
indirect relationship between the measurement models in a single path analysis model, which confirms the theory and verifies the hypothesis. The findings from both the measurement models and path analysis models enable the researcher to draw better conclusions and recommend a superior theory of SISP in Libyan organisations.

6.11 The research hypotheses tested in this study

The research hypotheses in this study are theory driven; thus, they have been developed to test the theory and answer the research questions, as stated in the first chapter. Further to the discussion in chapter six regarding the findings that confirm the research hypotheses, this section will underpin previous analyses and discussions to illustrate which research hypotheses have been verified. As outlined in chapter four, there are three main hypotheses examining the different affects and relationships that constitute the research model. These hypotheses are as follows:

H1: SISP context has direct positive or negative effect on perceived SISP success

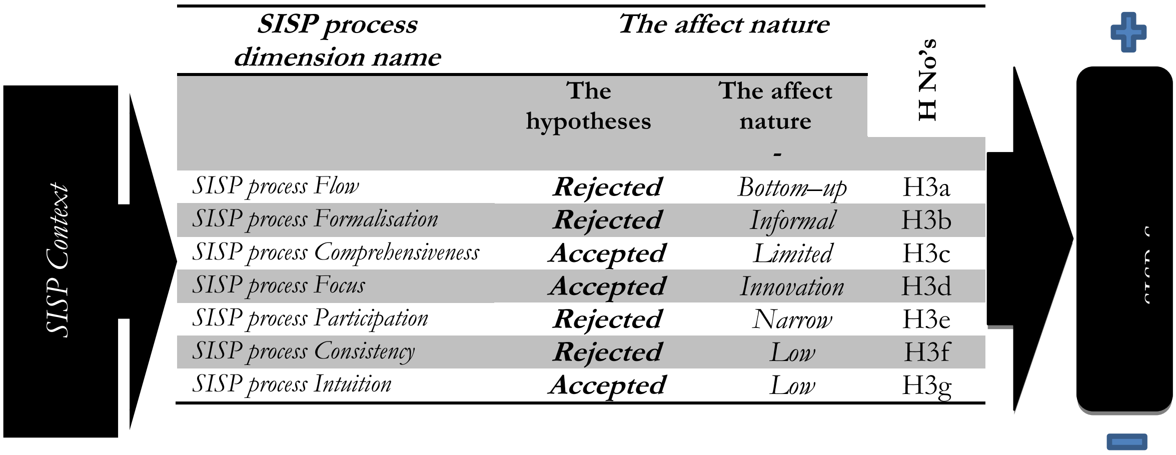
SISP context affects the formulation of the IS planning process, which also confirms the suggestion that SISP should be considered within an organisational context for possible leveraging of the cognitive capabilities of decision makers (Grover, 2005; Palanisamy, 2005). Newkirka suggested that the SISP process incorporates exhaustiveness and inclusiveness, and would be more effective in changing SISP context (Newkirka , 2007). The seven SISP process approaches in this study were modelled to test the effect of SISP context on each approach; the findings suggest that there is a direct and indirect effect of SISP context on SISP success that occurs through SISP process.



H No's	SISP process dimension name	The hypotheses	The affect nature
			+
H2a	*SISP process Flow*	*Accepted*	*Top–down*
H2b	*SISP process Formalisation*	*Accepted*	*Formal*
H2c	*SISP process Comprehensiveness*	*Accepted*	*Comprehensive*
H2d	*SISP process Focus*	*Accepted*	*Control*
H2e	*SISP process Participation*	*Accepted*	*Broad*
H2f	*SISP process Consistency*	*Accepted*	*High*
H2g	*SISP process Intuition*	*Accepted*	*High*

Figure 74: H2- SISP Context has a Direct Effect on Perceived SISP process

Various researchers have proposed a theory-based model for the appropriate implementation of IS in changing organisational contexts (Sousa & Voss, 2008). As mentioned above, the causality of the relationship emerges from the contingency theory of information systems, and there is a strong body of SISP literature to support such causality (Sambamurthy & Zmud, 1995; Segars & Grover, 1999; Segars & Grover, 2005; Newkirka , 2007). In the second hypothesis, the SISP context has an impact on the planning process for information systems. These hypotheses are accepted in the sample study, as the research demonstrates, within the path analysis model, showing that all aspects of SISP context have a direct effect on the process of information systems planning. In addition, the study reveals that all of these effects are positive, which means that the increase in SISP context (see chapter seven) will be followed by an increase in the SISP process (see chapter seven and Figure 66). In the third hypothesis, where the fit between the SISP context and the SISP process has a positive or negative effect on the perceived SISP success, the research findings support this suggestion. However, the causal relationship in the path analysis is surprisingly different from what was expected; the theory suggests that the more rational the planning process becomes, the greater the chance of increasing SISP success (Grover, 2005).



SISP process dimension name	***The affect nature***		**H No's**
	The hypotheses	**The affect nature -**	
SISP process Flow	***Rejected***	*Bottom–up*	H3a
SISP process Formalisation	***Rejected***	*Informal*	H3b
SISP process Comprehensiveness	***Accepted***	*Limited*	H3c
SISP process Focus	***Accepted***	*Innovation*	H3d
SISP process Participation	***Rejected***	*Narrow*	H3e
SISP process Consistency	***Rejected***	*Low*	H3f
SISP process Intuition	***Accepted***	*Low*	H3g

Figure 75: H3 The Fit between the SISP Contexts and SISP Process has a Positive or Negative affect on Perceived SISP Success

The research findings confirm the suggestion that the fit between SISP process focus, SISP process comprehensiveness and SISP process intuition has a mediating effect between SISP context and SISP success. These SISP process approaches fall under the rationality and intuition stages of growth. All of the SISP process approaches have negative effects on SISP success, which means that when the SISP process increases by one, the SISP success will decrease by one. This also suggests that SISP success will increase if SISP process decreases, and that under the current SISP context, SISP process approaches will result in better SISP success if the SISP process focuses on innovation. SISP process comprehensiveness is limited and SISP process intuition is low.

6.12 Implication of the study on the current theory

As mentioned above, research can be classified into two main enquiries regarding to the purpose of investigation: One is exploratory enquiry, and the other is confirmatory enquiry (Robson, 2002). While exploratory enquiry pursues qualitative methodology emphases in theory building, confirmatory enquiry adopts a quantitative-based methodology that emphasises the empirical testing of an existing theory. This research focused on theory testing through confirmatory research enquiry. Eisenhardt (1989) identified three different uses of theories in information systems research: (1) as a guide to research planning and data collection, (2) as part of an interactive process of data collection and analysis where hypotheses are developed, data observed and analysed and the initial theory is confirmed, expanded, revised or abandoned altogether and (3) as a final product of research. The third option is associated with exploratory enquiry, which this research does not pursue. Thus, the implication of the study on the current theory is divided into two separate parts: First, the research used the theory as a guide for the research plan and data collection process; in this way, it was able to tailor a methodology that guided the research all the way to confirmation of the theory. Second, the study had implications for theory testing; here, an interactive process of data collection and analysis occurred where hypothesis were developed, data observed and analysed and the initial theory was confirmed in the sample data, along with expansion of the theory constructs. The results of this study are consistent with Grover's (2005) suggestion that such contingent effects should be tested in SISP research, and explain the findings of fit-based relationships suggested by Bergeron (2001) and Venkatraman (1989), as has been done in prior MIS and SISP research studies (Grover, 2004; Alan, 2004; Bergeron, 2004; Dong, 2008). Unlike other SISP studies which focused on examining different parts of the theory, the current study developed a path analysis model that tested all of the contingent theory strategic fit elements in a single model that proved to be valid in the sample study.

6.13 Chapter six conclusion

This chapter reviewed the findings from the measurement models and the path analysis model. Through data analysis of the measurement models, the constructs of SISP context, SISP process and SISP success were tested. Convergent and discriminant validity, as well as reliability of the constructs, were established to ensure the effective incorporation of the measurement constructs in the structural model. Through the structural model and the individual path analysis, the causal relationships between SISP context, SISP process and SISP success were tested and validated. Through the structural model, it was found that the SISP context, which includes the centralisation of organisational structure, the creative leadership orientation, the controlling leadership orientation and riskiness in organisational strategic orientation, greatly impact upon SISP process, and directly and indirectly affect SISP success.

When managers plan for IS, they should consider the processes that permit more success for their organisational information systems. The processes in the sample study which confirmed the theory by exhibiting the most effective outcome were limited to comprehensiveness, innovation focus and low innovation. Hence, a manager should be able to keep a close focus and adapt to the changing business environment in the course of planning; as SISP context changes, managers should measure them against the SISP process and SISP success. The model developed in this research gives an adequate measurement of how successful SISP will be in a given organisational context. Extending the theory and improving on the construct measurement to develop an approximate model of SISP success (under the given context) is the central focus of this research.

Chapter Seven: Contribution and Conclusion

7. Introduction

This chapter is the seventh and final chapter of this thesis. It draws conclusions based on the previous six chapters. The main objective of this research was to investigate the effectiveness of SISP in Libyan organisations, by means of examining the relationship between SISP process and the effectiveness of SISP under different organisational contexts. The nature of the investigation was based on testing the contingency theory as applied in SISP research. The theory conforms to Venkatraman's (1989) model of strategic fit-based relationships. The interest for this research arose from the important role of strategic management in deploying IS within an organisation, as an organisational tool capable of adding value to overall organisational effectiveness. The following discussion demonstrates the contribution of this research, its limitations, and implications for practice and recommendations for further research.

7.1 Research contribution

The following discussion reports on the contributions of this research. This section is divided into the following three sub-sections: 1) contribution to the MIS theory and research methodology; 2) contribution to the constructs; and 3) contribution from the research model.

7.1.1 Contribution to the theory

This section discusses the contribution made toward the theory used, and the research methodology followed in completion of the research. The causal relationships between the research constructs were gained from the contingency theory of information systems. By applying Venkatraman's (1989) strategic fit models to the theory, the research was able to construct a model of strategic fit between SISP context, process and success in Libyan organisations. Thus, the research model and hypotheses were soundly generated and developed from strong theoretical backgrounds; they were also supported by existing empirical research findings. As a result, the research was able to successfully test the theory in Libyan organisations and confirm the causal relationship in the hypothesis, illustrating that the theory is robust and valid in its application to developing countries such as Libya.

7.1.2 Contribution to the research methodology

The research in this study follows a logical design for a quantitative research methodology. The measurement items all pre-exist within the literature of SISP and strategic management research. Firm-validating processes were undertaken from these measurements in the sample data, where data triangulation was applied in the quantitative data collection. The measurement models in this research underwent the latest validation and purification procedures as they apply to MIS research. The contributions of this study are as follows:

1: Improvements to the current construct validation process were made by constructing a research methodology model using SEM methodology. This can test construct measurements for validity and reliability to achieve higher levels of research rigour within MIS and SISP research. When converting these measurements into a path analysis model, there will be a great chance of obtaining a result that fits the model.

2: Contribution has been made to the research model, where the SISP process construct was tested as multiple mediation construct in one single model; each dimension of the SISP process was represented as a latent variable, rather than using the SISP process as one single latent variable or modelling each dimension in a separate model. As mentioned previously in the methodology section, there are several advantages to specifying and testing single multiple mediation models. Firstly, testing the total indirect effect of SISP context on SISP success is equivalent to conducting a regression analysis with several predictors, with the aim of determining whether an overall effect exists. Secondly, it is possible to determine the extent to which a specific SISP process mediates the SISP context for SISP success effect, depending on the presence of other mediators in the model. Thirdly, when the measurement model omits some of the construct indicators, it will minimally affect the overall bias of the construct when using multiple mediators. Fourthly, including several mediators in one model allows the research to determine the relative magnitudes of the specific indirect effects associated with all mediators, and it gives better determination of the causal relationship. Including multiple mediators in the same model is one way to distinguish between the components of one theory within a single model, which is a good scientific practice (Preacher et al., 2008). This study may be considered the first of its kind to take the initiative and apply such a model to SISP research based on logical explanation; however, Henry *et al.* (2008) published an SISP paper using a similar model. This research therefore considers the paper as support of the model's validity, especially because Newkirka and Lederer are considered to be international experts in SISP research and have a long record of publications in SISP.

7.1.3 Contribution from the research model

This research makes a substantive contribution and insight into the line of investigation advocated by Grover (2005), in which they suggested that good research will look for a relationship between SISP success, SISP process and aspects of SISP context. Building on these relationships, the study develops and tests a model of how the other two SISP constructs relate to success. The model is an excellent fit to the dataset, at a confidence level of 90%. Within this model, the flow of direct and indirect causality is tested. As a result, this research extends beyond other studies, which mainly restrict themselves to investigating separate aspects of the three constructs, or at best investigating the relationship between two constructs (apart from a major PhD thesis submitted to the London business school (LBS) in 2004 that managed to investigate the three constructs in one model; however, this used different measurement items for the SISP process and for some aspects of SISP context). This study offers an important confirmation of Grover's (2005) stages of growth in the SISP process. However, the most remarkable finding is that of the relationship between the SISP process and SISP success under the influence of SISP context. The findings suggest that when the research models have a good 'fit' at Chi-Square/degree of freedom$\frac{x^2}{df} = \mathbf{1.36}$), three types of planning process exist in the sample model. These are the 'focus' planning process, the 'comprehensiveness' planning process (both of these belong to the rational planning process) and the 'intuition' planning process. The findings suggest a negative impact between the SISP of these types of planning process and SISP success. When comprehensiveness, focus and intuition increase by one, this is followed by a sequential decrease in success, at -1.180, -0.843 and -0.378.

Each dimension of the SISP process has two planning phases which contradicting one another and represent the nature of the dimension, which informs us about what type of planning process, is followed. These dimensions are 'comprehensiveness of the planning process' (comprehensive vs. limited)', 'focus of the planning process' (- innovation vs. + control) and 'intuition in the planning process' (- low vs. + high). As mentioned above, the three dimensions are found to have a significant effect in the model; these SISP process dimensions are affected by the SISP context and have an effect on SISP success. The result suggests that there is a direct and indirect effect from SISP context on SISP success. The indirect effects are through the SISP process; all of the effects by SISP context on SISP process are positive (+) and all of the effects of SISP process on SISP success are negative (-). This finding suggests that when an SISP planning context that includes centralisation in organisational structure, creative and controlling leadership orientation and risk taken as organisational strategy, it increases the SISP process of comprehensiveness, focus and intuition further toward more comprehensiveness, control and high intuition. However, when the SISP process increases, the SISP success will decrease. This suggests that when planning comprehensiveness for information systems is 'limited' rather than 'comprehensive', and when the planning focus is on 'innovation' not on 'control', with 'low' planning intuition, the SISP success will increase. This is new knowledge and is an important finding. Whilst this is beyond the scope of this study, the research background has the capacity to explain further. To go a step further in explaining this finding, the model suggests that in order to achieve and increase SISP success, SISP context should demonstrate less centralisation in organisational structure, less riskiness in organisational strategy and perhaps collaboration rather than creativity, as well as a competitive rather than controlling leadership orientation. Thus, to sum up, the following contributions have been made to understanding what leads to SISP success:

- The contingency theory as applied to IS was confirmed, supported by the strategic fit model to recognise the significant relationships between SISP context, SISP process and SISP success in Libyan private and public organisations.
- A model was established from the dataset as to how SISP context and process fit together and mediate the effect to influence SISP success.
- It was confirmed that different stages of the SISP process are associated with different levels of SISP success, and that adaptability is the stage where SISP is most successful.
- It identified what organisational context has the most impact on SISP success and the degree of SISP process needed to achieve such success.

7.2 Contribution to the constructs

7.2.1 Contribution to SISP success construct

The SISP success construct, developed by Grover (1998), is one of the main research constructs in this study. This measure comprises two dimensions: 1) achievement of key SISP objectives representing alignment, analysis and cooperation, and 2) improvement of SISP capabilities. The lack of SISP capabilities' convergent validity permitted this construct dimension to be omitted from further consideration. Thus, the third dimension of achievement of key SISP objectives is represented by the SISP success construct. Content validity, convergent validity, nomological validity, discriminate validity and construct reliability for these dimensions were achieved. This is also the first study to use the measures in the Middle East, Africa and evidently in Libya. The discussion above suggests that this study has contributed to the construct in the following elements:

- It validated the construct measure for SISP success from Segars and Grover (1998) with managers responsible for SISP in Libyan organisations.
- It confirmed that the major dimensions of SISP success are the fulfilment of key SISP elements, including alignment, analysis and cooperation.

7.2.2 Contribution to the SISP process construct

This research used construct measurement for the SISP process, which has built upon Grover's (1998) work. The SISP process construct measurement that this study uses is also called SISP stages of growth. The study has taken these stages, namely 'rationality and adaptability' stages, as proposed by Grover (2005), and added another stage developed from the strategic management research, namely 'intuition', to represent the preliminary stage in decision making (Osman, 2010). The SISP process construct is a multidimensional, multi-sub-dimensional, multi-item measurement. However, in the main model, the study uses the sub-dimensions of the SISP process as mediation constructs. The study operationalised the propositions by Grover (2005) to include seven constructs that represent 'rational, adaptable and intuitive' SISP process (refer to the operationalisation section). Out of these seven dimensions, six have been validated to the stage of CFA, and five accepted to 'fit' in the model. However, only three constructs in the final model demonstrate a significant 'fit', namely focus, comprehensiveness and intuition.

To summarise, this study's contributions to construct measurement for the SISP process are as follows:

- It validated multidimensional, multi-item measurements for the SISP process construct, as proposed by Grover (2005).
- It operationalised the SISP process stages of growth model developed by Grover (2005), namely preliminary, evolving and mature, to the SISP process measurement, and identified the impact of each stage, specifically rationality, adaptability, and intuition on the success of SISP.
- It validated five SISP process dimensions and identified three out of five SISP process dimensions that have a significant impact on SISP success in Libyan organisations.
- It operationalised a measurement for the SISP 'intuition' dimension from a strategic process reference discipline, building on the propositions of Grover (2005) and using validated measurement items for the dimension from the work of Khatri and Ng (2000).

7.2.3 Contribution to the SISP context construct

The SISP context construct was originally developed from a wider concept of organisational context; however, the organisational context is a much wider concept to be utilised and measured. Therefore, this research focuses on the meta-structure of organisational context as found in the contingency theory of information systems, a theory that looks at organisational context as a construct that contains seven contingent variables (strategy, structure, size, environment, technology, culture and task). Thus, this research is able to operationalise organisational context as a multidimensional, multi-item construct with the support of the theory and other SISP studies. Overall, six out of seven dimensions were validated through a rigid construct validation methodology. Once these construct dimensions show an acceptable reliability and validity level, they can then be converted into the research model, in which SISP context represents the independent variables. The study is able to contribute to SISP research by operationalising and validating the SISP context in Libyan organisations and testing the direct and indirect effect of these contexts on SISP success. The SISP context constructs that have been independently validated include second- and first-order constructs. However, when converting the measurement models of SISP context into the path analysis model, the SISP context is used as a second-order formative construct. The constructs that are found to have a significant direct and indirect impact on SISP are those of 'creative and controlling' leadership orientation, 'riskiness' strategy and 'centralised' organisation structure. This is a significant contribution and it is one of the main research objectives and hypotheses.

- Operationalisation and validation of SISP context according to the contingency theory of information systems.
- Tested and confirmed the proposition by Grover (2005) that there is a relationship between SISP context, SISP process and SISP success using one model.
- Utilised construct measurement from the competing value of leadership orientation model.
- Independently modelled SISP context against SISP process and SISP success.
- Recognised the SISP contexts that exist in Libyan organisations and the effect they have on strategic planning for information systems process, as well as on the success of such planning.

7.3 Research implications

The above contributions summarise the main hypotheses, objectives and outcomes achieved in this study. The research findings are put forward in the context of an existing body of knowledge and the contributions to knowledge have been expanded. In the following discussion, the researcher will outline the research implications.

7.4 Implications for practice

Companies should realise that when planning for information systems, organisational context is a significant factor that needs to be taken into consideration, including its impact on the process of carrying out such a plan and ultimately its success. In the following discussion, I will examine each of the research constructs and their implication for practice.

7.4.1 Implications for practice of SISP process

Managers who want to plan for information systems need to consider three different taxonomies, which are differentiated by the level of rationality implied in the plan, and consist of planning 'rationality', planning 'adaptability' and planning 'intuition'. Each of these taxonomies consists of a different planning process or approach. The study operationalised and uses these taxonomies. Knowing what process companies may pursue in their development of an IS plan is important for its success. This study provides a structure where the dimensions and sub-dimensions of SISP process are validated in separate measurement models of the first and second order, with all the dimensions modelled as mediation constructs in the path analysis model. From this investigation, it has been found that Libyan companies use five different types of SISP process. These are 'comprehensiveness, focus, participation, consistency and intuition'; however, only three of these SISP process dimensions have been proven to have a significant impact on SISP success, specifically comprehensiveness, focus and intuition. The first two dimensions belong to the rationality taxonomy, with intuition as a stand-alone taxonomy. Managers who are responsible for the strategic planning of information systems in their organisation need to realise that different SISP processes are associated with different levels of SISP success. Therefore, selecting the process organisations will follow in their development of strategic planning is very important to the success of the plan. As organisations evolve, these processes should evolve with them to recognise the changing nature of the organisation's environment and give them a better competitive advantage. Improving SISP process is a vital factor to improving SISP success; from the results, managers in Libya have used different planning process 'approaches' in their SISP development. However, few approaches demonstrate a strong and significant relationship with SISP success under the effects of organisational context. Therefore, finding the right fit between SISP context and process is very important to the success of SISP. Grover (2005) suggested that as the SISP process moves toward more rationality, it becomes more successful; however, for the present analysis, this might be not the case. In Libyan organisations, the data show that an 'intuitive' planning process could lead to a rather more successful SISP. In organisations such as those in Libya, this could very well be true, and can be explained by the centralised approach in the organisational structure, where managers who are responsible for IS planning are the same managers who know the inner workings of an organisation's context. Thus, such knowledge should be used to find and deploy an IS that best suits that organisation. One can argue that this approach is not sustainable, as it means that certain personnel in the organisation maintain the knowledge. It may therefore not provide long-term success of SISP, given that SISP is a dynamic process that has to be kept updated with the organisation's context, and most importantly, its strategy. On the other hand, the rationality process does provide more sustainable planning that can be maintained and improved over time, as one of the characteristics that differentiates this process is that it is documented and can be built upon and improved regardless of any change in management. Another very important point related to the SISP process in Libya is that most organisations neglect the planning process, which represents the adaptability of the plan. The usability of this approach remains insignificant in Libyan organisations. One might argue that this is the most important stage of planning, as it reflects on the stage of organisational development; this requires more participants who can contribute and add value from their knowledge to the plan, and contributions may be offered from all levels of stakeholders. Consistency means that when the need arises due to the changing nature of the organisational context, it can be addressed and considered through meeting with the stakeholders. This approach is worth taking into consideration given that most Libyan organisations are in the evolving stage of their maturity level.

7.4.2 Implications for practice of SISP success

The SISP success measures used in this study are well established, and have long been approved in prior studies. Thus, managers who want to assess their degree of SISP success can always rely on these measures. Originally, the SISP success measure included two main dimensions: SISP 'capabilities' and key planning objectives, which included three sub-dimensions: 'alignment, analysis and cooperation'. These measures are robust, and managers can rely on them to assess the extent of the viability of their plan. Although the construct measurements contain two main dimensions, in this study only one dimension proved to be valid, specifically the key planning objective. Improvement in the planning capabilities dimension was shown to be invalid in the current research. Managers can improve their SISP outcomes by adapting more measurement items for the fulfilment of the key objectives construct dimensions, and can perhaps improve on their planning capability by considering the planning capability measurement items for their SISP outcomes. In addition, managers should realise that a great level of SISP success is associated with SISP process and context. Therefore, selecting the SISP process an organisation will follow has an effect on SISP success, along with organisational context, which affects the level of SISP success directly and indirectly through SISP process.

7.4.3 Implications for practice of SISP context

The SISP context used in this study is taken from contingency theory as applied to information systems. Overall organisational context, which includes organisational maturity, structural strategy, environment and leadership orientation, have all been validated in this study; however, few SISP contexts have been found to have a significant impact on SISP process and SISP success. Centralisation in the organisational structure, creative leadership orientation, controlling leadership orientation and organisation strategic riskiness are all organisational context factors that have an impact on how SISP is formulated and on the degree of success achieved by SISP in Libyan organisations. The research suggests that when these factors are high, they positively affect comprehensiveness, focus and intuition in the planning process. Managers should be able to manipulate these factors to find the perfect fit between organisational context, SISP process and SISP success. Managers should also consider looking at the level of association represented in the variance between organisational contexts, SISP process and SISP success. Here, they may be able to manage and adjust some of the organisational contexts, such as organisational strategy leadership value and orientation, as well as the organisational structure. This, in turn, may work toward meeting the requirement of fitting news information systems that can compile and align the organisational context and include the very important factor of business strategy with information systems architecture. However, the question remains: What is to be adjusted to fit with what? DO the organisation's contexts have to be adjusted to fit the information systems? Or is it the information systems process that needs to be modified to fit the organisational context? A large part of answering these questions relies on the nature of SISP as a dynamic process, where the manager should find an equal fit between organisational context and the information systems for which they want to plan. This research has set the SISP success measurement as a dependent variable; such that any change in SISP context and SISP process is measured against the change in SISP success. This will depend on the benefit gained by the organisation from change on each side. For example, some systems will not benefit from the current value created by an organisation's set of contexts, including strategy; therefore the organisational context must be altered to fit the system, and this includes the strategy if required. However, if an organisation has a set of contexts that are well established, and more importantly well engaged with the environment, and wants to implement an information system to support their establishment, the information system has to be modified to fit this establishment and add value, effectiveness and efficiency to the management of the organisation. This reiterates the earlier argument in this research that there is no one system that fits all organisations; each organisation operates in a different environment and has its own culture. One must outline that in this research, as is so in much other organisational research, it always come down to the fact that organisational value is created by many contextual factors combined together as explicit organisational systems. However, in order to produce the value which differentiates one organisation from the other, the inexplicit real value added remains in the hands of leaders that makes the strategic decisions. Thus, leadership is the core asset to any organisation and in this case, CIOs, CEOs and other managers who are knowledgeable and responsible for planning for information systems are the only people who can decide on what change is created by implementing information systems.

7.5 Limitations of the research

In all research there are limitations; here, the limitations are represented by the scope, which has restrained the research throughout its different stages.

7.5.1 General limitations

Given that this research is concerned with strategic information systems planning studies in developing countries, most of the literature was found in journals related to information systems management and strategic management research. However, most of these journals were published in Western countries, with few journals found to discuss similar research topics in developing countries. This is considered to be a limitation that this research faces. With less insight from prior research in developing countries, this study is one of the first in this field. Moreover, the sample collected is medium sized, and from a medium to large companies based in Libya. Thus, there is a limitation resulting from the sample population.

7.5.2 Construct measurement limitations

The construct measurements in this research were adopted from prior studies, as they have been extensively validated. Although a rigorous construct development and validation methodology was adopted in this research in order to eliminate bias as much as possible, the accuracy of the results will still largely depend on the respondents to the questionnaire and their knowledge.

7.6 Main conclusion

This research adopted SEM as a methodology to develop and validate constructs; its measurement items have been originally developed and modelled in a causal relationship to test the theory under investigation in Libyan organisations. Given that the main method of data collection used was quantitative, some unofficial interviews with both managers and professionals were carried out to give the researcher more in-depth knowledge about the subject. Being a quantitative rather than qualitative study, this limited the outcomes and findings of this research. Despite the robustness of the construct measurement used, which allows replication and can be deployed with any sample data, the result of significant causality between construct measurements may largely depend on the sample data collected, so it may be necessary to repeat some results. This research can be extended to investigate the results achieved for more in-depth quantitative research. This could be attained by applying a mixed methodology to investigate the results of the quantitative data, followed by qualitative data analysis. In addition, further investigation and updating of the literature—especially in the domain of organisational context—would be very beneficial to SISP research, given that organisational context is a very dynamic subject and evolves with the advancement of business environment. Developing more paradigms for organisational context rather than that listed in the contingency theory would be very beneficial both for theory development and testing, as well as possibly providing more in-depth knowledge to the research paradigms. In addition, in today's business environment it is very hard to differentiate between business strategies and IS strategy. Thus, business is trying to set its infrastructure to suit a set of systematised processes that are supported by IS. Therefore, as information systems producers are realising why and how business is carried out, they are trying to create computer-supported business applications that are suitable for business processes. This means there is a wide scope for theory development in the domain of strategic business and IT alignment research, which could be a new area for digital business strategy. One would suggest using the theory from different disciplines of business, including marketing and strategic management research, as companies are ahead of academics in practice. For example, these days, most computer-based applications shift from more investments in hardware toward heavy investment in software, because the new cloud technology is replacing the need for investment in hardware. Therefore, new concepts such as SaaS and on-demand applications have been introduced, and they work well with cloud technology. The construct measurement for the SISP process is robust, even if the context has changed. However, this does not mean that the construct measurement of the SISP process cannot be improved; the literature that concerns strategic decision making is found relating to both the developed and the developing world. To summarise, the research can improve in two major areas: The first is the measurement constructs, which can be further improved by a more rigorous validation and perhaps more measurement items added. The second improvement is to enhance the research methodology, as this research has applied a very rigorous research methodology that supports the SEM quantitative approach. Future research might undertake the mixed methodology approach to improve the findings.

8. Reference

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[i] Cronbach's alpha Values of 0.70 or higher are considered adequate (Fornell, C., & Larcker), However, reliability scores as low as 0.5 or 0.6 can be acceptable if some other items measuring the same construct have high reliability scores (Chin 1998)

[ii] (AVE) Represent when variance explained by the construct is greater than measurement error and its significant when average variance extracted over 0.50 (Fornell and Larcker 1981)

[iii] (Pc) parameter estimates of unidimensionality models used to calculate the internal consistency extent to which the items reflect one underlying construct composite and it measure reliability of the dimensions and its adequate of Values of 0.70 or higher (Werts, Linn, and Joreskog 1974)