An Investigation of IT Governance Practices in SMEs in South Africa

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Abstract

The importance of Small and medium enterprises (SMEs) and Information Technology (IT) is widely acknowledged. Various government initiatives leverage both for socio-economic development and national growth. However, SMEs are characterised by lack of resources, which hamper IT value delivery. IT governance is a mechanism for maximizing IT value and has the potential for alleviating the barriers to IT use in SMEs. Notwithstanding its benefits, empirical evidence on IT governance in SMEs is scant. The purpose of this research is to contribute to knowledge in this field.

The literature suggests that IT governance and SMEs should be investigated from managerial, organizational and external perspectives. This research examined the impact of selected managerial, organisational and external characteristics of SMEs on IT governance practices and the relationship between such practices and IT value. Data was collected in a survey involving firms in the IT, finance, transport and retail sectors in three provinces in South Africa.

The findings show that the firms did not have effective IT governance practices. In addition, there were significant differences in IT governance practices according to the position and background of managers, size of firm, type of IT structure, location of the firm and the type of industry. Ancillary findings show the lack of familiarity with the Electronic Communication and Transaction Act (2002) and IT governance frameworks, and implementation of the latter. Based on the findings, recommendations are made for IT governance practice and research.

Dedication

I dedicated this to the Abu family of Akim Kotokuom in Ghana, and to the loving memories of Kwame Akuoko-Abu, my brother and friend, who died days before I commenced this course; Kwame Abu Bonsrah, my father, who inspired me to be who I am; and my grandmother Sarah Ampomah, who taught me, when I was young, that a seed of sacrifice will always blossom into a harvest of rewards.

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Chapter 1: Introduction

The roles of Small and Medium Enterprises (SMEs) and Information Technology (IT) in socio-economic development are well-documented. To re-position their economies, governments worldwide have adopted strategies which seek to leverage both for competitive advantage and sustainable growth. Traditionally, SMEs are known for poor IT resource and risk management. However, globalisation and the attendant information economy have heightened the need for firms to be competitive.

SMEs may use IT governance to improve IT business performance. This chapter places the research in context. It describes the importance of SMEs and IT in national development, the implications of the information economy, and the need for IT governance. The purpose, remits and relevance of the research are discussed. Lastly, the structure of the entire research document is outlined.

1.1 Background

The importance of SMEs cannot be over-emphasised. Various authors have highlighted their contribution to job creation, poverty alleviation, socio-economic growth and gross domestic product (GDP). It is estimated that SMEs account for about 65 percent of employment in 130 countries around the world (UNDP-APDIP, 2007) and 30 percent in Africa (Rogerson, 2000). The sector constitutes about 95 percent of firms and accounts for about 60 to 70 percent of employment in the Organisation for Economic Development (OECD) countries (OECD, 2002). In South Africa, there are about 1.8 to 2.6 million SMEs, employing 62 percent of the total workforce and contributing between 52 and 57 percent to GDP (RIA!, 2006).

A report by United Nations Industrial Development Organisation for the 2003 World Summit on the Information Society stated that SMEs could be a tool for job creation, economic growth and poverty alleviation in developing countries. However, compared to larger firms, SMEs have a higher failure rate. Brink, Cant and Lighthelm (2003) estimate the failure rate in South Africa to be about 70 to 80 percent. This failure rate has been attributed to external, organisational and managerial factors unique to the sector. It is generally acknowledged that, as a consequence of

their small size, SMEs lack skilled employees, financial resources, physical infrastructure and the managerial expertise to deal with the opportunities and threats presented by external factors such as competition and government regulation (Brink *et al.*, 2003; Weber, 2002).

1.1.1 The Information Economy

In recent years, globalisation, liberalization, deregulation and the decreasing cost of IT have removed trade barriers and engendered the convergence of product and capital markets. This has spawned a global marketplace, driven by information and information sharing, in which SMEs compete with each other and with their larger counterparts worldwide (Aragón-Sánchez & Sánchez-Marin, 2005). In this marketplace, variously described as the global economy, information economy and knowledge economy, IT is the medium for transactions and communication (OECD, 2004b). The information economy has changed the operational and managerial systems within firms. This has implications for SMEs, e.g., increased competition for access to capital, infrastructure, skills and markets. Given the importance of the sector, governments worldwide are creating the necessary environment for integrating SMEs into the information economy.

1.1.2 Promoting SMEs

According to OECD (2004b), IT can improve resource management and communication within SMEs. At the inter-firm level, it could increase the speed and reliability of transactions, enhance coordination and reduce inefficiencies in the value chain among firms. A report by United Nations Conference on Trade and Development (UNCTAD, 2004) also states that IT could reduce the cost of transactions, increase access to market and information and, thereby, improve efficiency and competitiveness of SMEs. Southern and Tilley (2000) also enumerate cheaper and faster communication, improved customer and supplier relations, reduced regulation cost, and better access to information and training.

Recognising its importance, governments worldwide have integrated IT into national and regional strategies for socio-economic development (Burgess, 2002; Southern & Tilley, 2000). Various policies and agencies have been instituted to provide financial, technical, managerial and other forms of support to SMEs. In South Africa, policies and regulations, e.g., the National

Small Business Act (1996), National Small Business Amendment Act (2003) and the Electronic Communication and Transaction Act (2002) have been implemented. In addition, agencies, e.g., the Small Enterprise Development Agency, have been created. The Presidential National Council on Information Society and Development, a body constituted to advise the president on how IT could be used to promote the growth of the SME sector, underscores the government's efforts.

Parallels may be drawn between the initiatives by the South African government and its counterparts worldwide. For example, the government of the United Kingdom has implemented initiatives to enhance the competitiveness of the SME sector (Martin & Matlay, 2001; Richie & Brindley, 2005; Southern & Tilley, 2000). Many OECD countries have introduced general business and ICT policies, and constituted structures to promote SMEs (OECD, 2004b). Similarly, international agencies (e.g., UNIDO) have developed programs and initiatives that target IT to promote SMEs.

1.1.3 SMEs and IT

It is recognised that IT, if managed properly, can contribute to the success of SMEs (De Lone, 1988). The opposite is also true: if not well-managed or aligned, IT could affect the flexibility of organisational competencies (Huxley & Stewart, 2004). Although conducive policies and decreasing cost have contributed to a significant increase in IT adoption in SMEs (Hunter, Diochon, Pugsley & Wright, 2002), IT investments have not resulted in increased performance. According to Burgess (2002) and Ihlström, Magnusson, Scupola and Tuunainen (2003), SMEs are beset by "barriers" or "challenges" which hinder the strategic use and management of IT and, therefore, its contribution to business performance. These challenges have been ascribed to various factors, including dearth of managerial expertise, skilled workforce and adequate infrastructure (Burgess, 2002; Weber, 2002).

A review of extant literature shows a litany of challenges. For example, Burgess (2002) and Harindranath, Dryerson and Barnes (2008) observe that SMEs lack business and IT strategy; Kyobe (2004) found that SMEs do not use IT resources effectively; Upfold and Sewry (2005) and Weber (2002) concluded that IT security measures are inadequate; Duan, Mullin and Hamblin (2002) identified the lack of security and compliance; Burgess (2002) reported the lack of IT performance measurements; Burgess (2002) and UNDP-APDIP (2007) state the lack of

awareness of the potential benefits of IT; and Harindranath *et al.* (2008) discovered the lack of awareness of IT-related policies developed to assist SMEs.

On the other hand, it is reported that SMEs derive benefits from IT, as a consequence of their small size. These include, *inter alia*, flexibility, management involvement and organisational learning. SMEs are able to respond quicker to external changes to gain competitive advantage (Levy & Powell, 1998; Levy, Powell & Yetton, 2003). Top management is central to decision-making, and their participation may encourage desirable behaviour and result in the effective implementation and use of IT (Burgess, 2002; Thong, Yap & Raman, 1996). The small size translates into flatter organisational structure which creates a culture of support and encourages informal learning (Burgess, 2002; Levy & Powell, 1998).

1.1.4 Convergence of Governance and Regulatory Frameworks

As a consequence of the information economy, issues such as financial accounting, tax, money laundering, and computer misuse, have become prominent (Calder, 2005). Governments worldwide have therefore promulgated laws to promote desirable use of IT. For example, in South Africa the Electronic and Communication Act of 2002 (ECTA, 2002) enjoins firms to comply with data gathering, storage, processing, distribution and destruction regulations (Kyobe, 2009; Upfold & Sewry, 2005). Similar regulations have been developed around the world, e.g. Australia's Privacy Act of 1988.

The spate of corporate scandals and failures in the past few years (as evidenced by Enron, Worldcom, Arthur Andersen, the Asian crisis and, more recently, the global banking crisis), most of which involved the abuse of IT, has highlighted the need for governance mechanisms to protect the interest of shareholders and other stakeholders. This has culminated in the institution, or strengthening, of corporate governance frameworks worldwide (Mallin, 2006). Corporate governance demands economic, social and environmental responsibility from firms (King, 2002; King 2009).

In response to the prevalent accounting scandals, the United States (US) government passed the Sarbanes-Oxley (SOX) Act to prevent future occurrences and to restore public trust (Kaarst-Brown & Kelly, 2005). In South Africa, the King Commission has published guidelines for corporate governance (King, 1994; King, 2002; King, 2009). Similarly, the OECD has developed

guidelines for member countries (OECD, 2004a). While some corporate governance codes are guidelines of good practices, others are regulatory instruments which hold boards of directors and executive officers directly responsible for their firms' malfeasance (Calder, 2005; Mallin, 2006).

The information economy is complex and the applicable laws and regulations are both wide-ranging and far-reaching. As a result, various regional and international governance frameworks, standards and best practices are emerging to facilitate compliance. Khanna and Palupe (2004) contend that corporate governance codes are converging around international principles. For example, international standards for information security (ISO 27001) and accounting (the International Accounting Reporting Standards) have been adopted worldwide (Calder, 2005; Mallin, 2006).

The information economy has ramifications for all organisations. It has spawned a complex environment within which organisations are required to comply with a maze of laws and standards within their countries of origin and those of their customers (Calder, 2005). For example US firms, to which the SOX Act apply, require their suppliers to conform to the act so as to assure compliance. Consequently, firms are embracing corporate governance principles to assure compliance and to improve business performance.

Although there are conflicting views on the relationship between corporate governance and business performance (Denis, 2001; Korac-Kakabadse & Korac-Kakabadse, 2001a), there is ample evidence in the literature to demonstrate that the former leads to improved business performance (Brown & Caylor, 2004). IT has become an integral and crucial part of firms (Jordan & Silcock, 2005; De Haes & Van Grembergen, 2005). Thus, there has been growing concern for the strategic use of IT, and the management of the attendant risks, so as to contribute to business performance (Jordan & Silcock, 2005).

Boards and executives are being called upon to govern IT in the same manner as other functions of the firm, e.g. finance (Calder, 2005; Haes & Grembergen, 2005; King, 2009). The governance of IT, referred to as IT governance, has therefore emerged as a discipline with the overarching objectives of risk management and value delivery (ITGI, 2003; King, 2009; Pultorak, 2005). IT governance is not an end in itself, but an integral part of the organisation-wide governance

framework. It is, thus, the duty of the board and executives and not a responsibility of an individual or business unit (Hamaker, 2003; Hamaker & Hutton, 2004; Hamaker & Hutton, 2005; ITGI, 2003).

1.1.5 Governing Information Technology

IT investments constitute a large fraction of the budget of many firms (Csaszar & Clemons, 2006; Marshall & McKay, 2004). In addition, IT assets constitute firms' most valuable assets (Calder, 2005). Paradoxically, many firms fail to realise the benefits of IT (Tallon & Kraemer, 2003). This has been attributed to the failure to leverage IT for strategic benefit (Sohal & Fitzpatrick, 2002). The role of IT has evolved from operational support to strategic tool (Earl & Feeny, 1997; Ward & Peppard, 2005). In synchrony, approaches to realising IT benefits have evolved to encompass the entire IT environment: business, regulation and technology.

IT governance enables firms to effectively use their IT resources to support and engender new business strategies, while managing risks (ITGI, 2003; Jordan & Silcock, 2005). According to Csaszar and Clemons (2006), IT governance could improve on the contribution of IT to business performance. In a study involving larger firms, Weill and Ross (2004) concluded that, compared to their competitors, firms with effective IT governance experienced growth. IT governance has, therefore, received significant attention from academics, practitioners and government agencies in the recent past.

This is evidenced by the growing body of research and publications, the plethora of implementation frameworks and the efforts by countries, industries and firms to adopt IT governance to address their IT environments. For example, Information Technology Infrastructure Library (ITIL), a widely used IT governance framework, was originally developed by the government of the United Kingdom. Various surveys have identified IT governance as a key issue likely to impact on IT (Luftman & McLean, 2004; Luftman, 2005; Luftman, Kempaiah & Nash, 2005; Luftman & Kempaiah, 2008).

1.2 Problem Statement

IT, and in particular e-commerce, may offer SMEs the opportunity to compete or, in some cases, become a necessity for survival (Payne, 2003). Consequently, it behoves SMEs to manage their

IT effectively. ITGI (2006) contends that SMEs can derive the same benefits from IT governance as larger organizations. Jain (2009) argues that in the current global crisis, SMEs can achieve long-term growth by optimising IT, governance, and risk and compliance measures. Notwithstanding the potential benefits, developments in the field have concentrated almost exclusively on larger firms, although SMEs have different IT requirements, benefits and challenges. For example, in a recent survey, the IT Governance Institute (ITGI, 2009), an international body responsible for advancing IT governance thinking and standards, excluded firms with less than 100 employees, although 92 percent of European firms employ less than 10 people (Harindranath *et al.*, 2008).

Csaszar and Clemons (2006) observe that IT governance studies are predominantly qualitative and anecdotal, making it difficult to generalise findings and to advance normative judgement. Dahlberg and Kivijarvi (2007) argue that most studies have investigated separate and distinct aspects of IT governance, contrary to the complex and multifaceted nature espoused in the literature. A literature review by Buckby, Best and Stewart (2009) confirms the lack of "holistic viewpoint" and the noticeable paucity of empirical and quantitative research in IT governance in general, and in SMEs in particular. Considering the foregoing begs the question: why is IT governance in SMEs not well-researched?

A problem statement articulates the research problem (i.e., what the researcher wants to know), the research purpose, and the questions which may be answered to solve the problem (Oates, 2006). Subsequent to a preliminary literature review, the research problem was defined as "Why do SMEs fail to govern IT"? The research purpose and research questions are outlined below.

1.2.1 Research Purpose

It has been established from the foregoing that SMEs fail to govern IT; in addition, there is paucity of research in this domain. The purpose of this research is to gain insight into IT governance practices in SMEs, and thereby, contribute to solving the above research problem. Melville, Kraemer and Gurbaxani (2004) point out that managerial practices, organisational characteristics and environmental factors affect the contribution of IT to business performance. These factors are also known to impact on the effectiveness of IT governance (Korac-Kakabadse & Kakabadse, 2001b) and the success or failure of SMEs (Man, Lau, & Chan, 2002).

The research was, therefore, designed with the following objectives; to:

1. Investigate and describe IT governance practices in SMEs,
2. Identify the factors which influence these practices and, based on the results,
3. Prescribe a model to assist SMEs to effectively govern IT

To attain these objectives, the following research questions were subsequently formulated and empirically investigated.

1.2.2 Research Questions

It is recommended that research questions be divided into simpler sub-questions which, when resolved together, could provide a solution to the problem under investigation (Creswell, 1994; Oates, 2006; Walliman, 2005). The research problem was therefore broadly organised into the research questions listed below.

1. What are the factors which influence IT governance practices in SMEs?
2. What is the impact of these practices on IT performance in SMEs?
3. How could SMEs improve on IT governance?

1.3 Overview of the Research Methodology and Findings

This research employed a positivist, descriptive, quantitative, cross-sectional survey. Participants were drawn from SMEs in the IT, finance, transport and retail sectors in the Western Cape, Eastern Cape and Gauteng provinces of South Africa. A questionnaire was developed and used to measure strategic alignment, IT resource management, IT risk management, IT performance management and IT value. Using stratified purposive sampling, 600 firms were identified and invited to participate in the research. Data was collected from managers on behalf of their firms.

Sixty-seven usable responses were submitted to quantitative data analysis. This involved descriptive analysis of respondents, participating firms and responses; reliability assessment of the research instrument; establishing relationships between variables and identifying a structure to describe IT governance practices in the participating firms. Three overarching findings were derived from the results of the analysis. First, the firms did not have effective IT governance

practices. Second, managerial (i.e., position and background of the manager), organisational (i.e., size and IT structure) and external (i.e., location and industry type) characteristics influenced IT governance practices in SMEs. Lastly, there were significant relationships among the practices on the one hand, and among the practices and IT value on the other.

1.4 Delimitations of Research

Three delimitations apply to this research: only SMEs with less than 200 full time employees were surveyed; only, firms in the IT, finance, transport and retail sectors were considered; and lastly, the research covered only three provinces of South Africa. As a result, the findings may not be generalised to all SMEs.

1.5 Relevance of the Research

Benbasat and Zmud (1999) and Moody (1999) discuss the criteria for evaluating the quality of Information Systems (IS) research. These include, *inter alia*, relevance, theoretical significance and practical application. Relevance addresses the importance of the research problem and its practical benefits; theoretical significance is the contribution to illuminating the specialised area and the general body of IS; and practical application pertains to the extent to which research findings can be applied to improve practice.

This research addresses all the above-mentioned concerns. Given its potential for developing the SME sector, as outline above, research which seeks to improve the use of IT is both germane to the practice of IT governance and the field of IT. In respect of theoretical significance, this research makes two contributions. It builds on the IT governance domains identified in the literature (ITGI, 2003) by identifying the factors which influence the practices and establishing the correlation between the practices and IT value. It also contributes to literature on the governance of IT in SMEs which, thus far, is scant. Lastly, Buckby *et al.* (2008) note that for IT governance to be an acceptable part of organisational practice, more practical ways for implementation and evaluation have to be devised. The model and recommendations derived from the findings may be used as a framework for improving practice.

1.6 Referencing Technique

The American Psychological Association (APA) referencing style is employed throughout the document.

1.7 Outline of Document

The rest of the document is organised as follows- *Chapter 2: Review* of *Literature* analyses existing research and literature, and identifies the underlying theories and concepts relevant to this research. A conceptual model, illustrating the relationships between the concepts of interest, and research propositions, to help answer the research questions, are subsequently presented. *Chapter 3: Research Design* describes the research paradigm, strategy and methods. It discusses the research instrument, sampling and data collection and analysis techniques. *Chapter 4: Results* presents the results of the data analysis outlined in the preceding chapter. *Chapter 5: Discussion and Conclusion* discusses the findings in relation to extant literature and research, and draws conclusions. Lastly, implications for practice and suggestions for future research are provided.

Summary of Chapter

This chapter endeavoured to place this research in perspective, by outlining the background, purpose, remits and relevance. SMEs and IT have been adopted by governments worldwide as strategies for national development. Traditionally, SMEs lack the resources to effectively use IT. This has been exacerbated by the current business, legal and technological developments which are consequences of the information economy. IT governance may be used to reduce the barriers to IT use and thereby improve its contribution to business performance.

IT governance in larger firms has been well-studied. However, not much is known about the practices in SMEs. Empirical and quantitative research that describes the practices in SMEs is scant. This research addresses this gap and makes contribution to the field. Using a positivist, descriptive, and quantitative survey, it investigated some of the factors which influence IT governance practices in SMEs and the impact of these practices on IT value. The next chapter presents an analysis of existing literature and identifies theories, concepts and constructs relevant to the problem under investigation.

Chapter 2: Review of Literature

Since the advent of IT, researchers and practitioners have been preoccupied with its contribution to business performance (Brown & Grant, 2005; Melville *et al.*, 2004). Consequently, IT management practices aimed at improving IT performance have been well-studied (Boynton, Zmud, Jacobs, 1994). However, with the current developments in corporate governance, IT governance has gained prominence. The previous chapter defined the problem under investigation and outlined the scope and relevance of this research.

This chapter reviews existing literature to identify theories, concepts and constructs relevant to the IT governance practices in SMEs. It is organised as follows: *2.1 Governance and Management* identifies the concepts underlying governance, management and corporate governance and establishes their relationship. The objective is to trace the origins of IT governance. *2.2 IT Governance* describes the concepts identified in the preceding section in the context of IT, provides an overview of popular IT governance frameworks, and discusses prior studies relevant to this research. *2.3 IT in SMEs* outlines the unique characteristics which influence the use of IT within SMEs. *2.4 Conceptual Model* illustrates the relationship between the concepts of interest derived from the literature and provides a framework for investigating the research problem. *2.5 Research Propositions* presents a set of statements to be evaluated in order to answer the research questions.

2.1 Governance and Management

Literature distinguishes between governance and management. All firms make some forms of decisions. Rozman (2000) posits that the effectiveness of decision-making in a firm influences business performance. Fama and Jensen (1983) classify business decision-making into decision management and decision control. These represent the organisational functions of management and governance, illustrated in *Figure 2.1*. The objective of governance is to set and control strategies to ensure that business goals are accomplished. It involves developing the overall strategies, establishing structures through which decision authority may be delegated to management, and ensuring that managerial activities are consistent with achieving the strategies. Performance measurement is therefore an essential component of governance. It measures the

extent to which the strategies have been achieved and provides feedback for refinement (Chulani *et al.*, 2006).

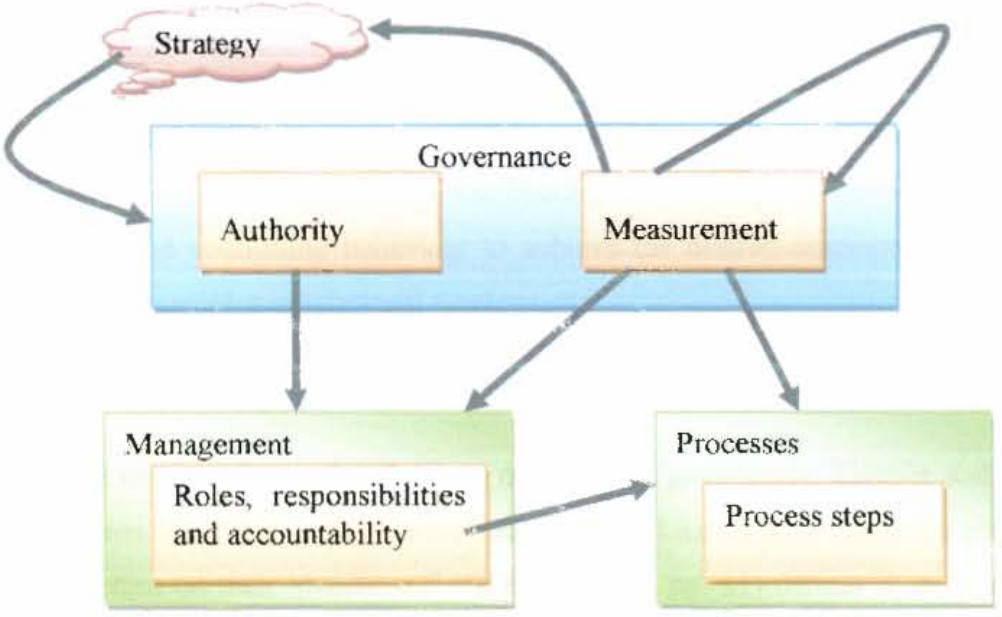

Figure 2.1: Relationship between Governance, Management and Processes (Chulani, Williams, Wegman, Yaeli & Cantor, 2006)

On the other hand, management is concerned with the efficient coordination of business processes to achieve the set strategies (Chulani et. al, 2006; Rozman, 2000). Management receives its authority and remit from governance, and plans, implements and monitors processes to achieve the desired outcomes. Processes are allocated together with resources to individuals or groups, who execute the steps to achieve outcomes. Management, therefore, involves day-to-day decision-making about resources, processes and activities of people, and is responsible for running the firm.

Notwithstanding the distinction, there is consensus in the literature that governance and management are complementary, and that the latter is an integral part of the former: "All companies need governing as well as managing" (Rhodes, 1996, citing Tricker 1984, pp. 6-7). There are various governance-management arrangements (Rozman, 2000). For example, decision management and control may be combined and vested in the same entity in small and non-complex firms but remain separate and distinct functions in larger and complex firms (Fama & Jensen, 1983). Thus, governance and management may reside in the same entity in SMEs.

2.1.1 Elements of Governance

Governance involves the composition, coordination and steering of structures to ensure desirable outcomes (Stoker, 1998). According to Chulani *et al.* (2006), a structure consists of components (e.g., committees, steering groups, etc), roles and responsibilities. A process is a collection of activities or tasks that must be accomplished to achieve the objectives set by the firm. Relational mechanisms are those required for coordinating and steering relationships among structures and processes, and controlling behaviour to achieve the desired outcomes. Regulations, rules and policies are examples of relational mechanism.

2.1.2 Corporate Governance: A Theoretical Perspective

There are many and varied definitions of corporate governance. Shleifer and Vishny (1997: pp 737) defines it as "the ways by which suppliers of finance to corporations assure themselves of getting return on their investment". OECD (2004a, pp. 11) defines it as "a set of relationships between a company and other stakeholders [and] provides the structures through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined". Cadbury (1992) describes it as a system by which companies are directed and controlled.

Corporate governance consists of relationships, structures and processes for assuring long-term sustainability of the firm (Abor & Adjasi, 2007). This is consistent with the elements of governance. The underlying principles of corporate governance have evolved over time. In synchrony, divergent views on its purpose have emerged (Sundaram & Innkpen, 2004). The shareholder, stakeholder, and contingency views are commonplace in management literature. As this is not intended to be a treatise on corporate governance, the raging debate on their efficacy or otherwise will not be sustained. However, a brief theoretical overview of the aforementioned views, to place IT governance in perspective, is worthwhile and will be pursued.

The *shareholder* perspective of corporate governance holds that the purpose of a firm is the maximisation of shareholder value. The central theme is the agency problem. As principals (owners or shareholders) entrust their resources (firm), and therefore managerial authority to agents, the latter may engage in decisions which are in their own interest and inconsistent with

the maximisation of shareholder value (Daily, Dalton & Rajagopalan, 2003). Accordingly, the purpose of corporate governance is to align managerial and shareholder interests so as to minimise the agency problem, maximise shareholder value, and ensure the long-term sustainability of the firm (Jensen & Meckling, 1976).

The *stakeholder* view is based on what has been variously described as the stakeholder model, stakeholder management and stakeholder theory (Donaldson & Preston, 1995). The central premise is that the firm must attend to the interest of all stakeholders, i.e., any individual or group that affects or is affected by the achievement of the firm's objectives (Sundaram & Inkpen, 2004). This means each stakeholder group, e.g., shareholders, employees, customers, suppliers, government and communities, should participate in determining the direction of the firm (Donaldson & Preston, 1995). The goal of corporate governance is therefore to maximise the interests of stakeholders to ensure the long-term sustainability of the firm (King, 1994; King, 2002; King, 2009).

Donaldson (2001, p. 7) defines a contingency as "any variable that moderates the effect of an organizational characteristic on organizational performance". The *contingency* perspective holds that the role of corporate governance may vary, according to the environment of firms defined by external and internal factors (Dedman & Filatotchev, 2008). This means corporate governance may be more effective if it takes into account factors such as the age, size and regulatory settings of the firm. This is illustrated in Figure 2.2. While best practices may exist (Filatotchev, 2008), this view refutes the notion of universal corporate governance practices or "one size fits all" approaches (Dedman & Filatotchev, 2008).

Figure 2.2: Contingency Perspective of Corporate Governance

Although agency is the earliest and most dominant, stakeholder, contingency and other nascent views are gaining currency (Daily, Dalton & Rajagopalan, 2003). The growing dependence on, and investment in, IT has resulted in the need for its governance to ensure it contributes to the overall business performance. Consequently, IT governance has emerged as a discipline,

underpinned by governance concepts and theories. For example, agency, stakeholder and contingency theories of governance have been used to develop conceptual and theoretical IT governance models (Korac-Kakabadse & Korac-Kakabadse, 2001b; Sambamurthy & Zmud, 1999).

2.2 IT Governance

IT governance has its origins in corporate governance (O'Donohue *et al.*, 2009; Simonsson & Johnson, 2006). There is no universally accepted definition of IT governance (Brown & Grant, 2005). Due to the complex nature of the discipline, different definitions emphasise different aspects, and this divergence has permeated both research and practice (Webb, Pollard, Ridley, 2006). Table 2.1 shows some of the most commonly used definitions.

Definition	Source
IT Governance is the decision right and accountability framework for encouraging desirable use of IT	Weill & Ross (2004)
IT Governance consists of the leadership and organisational structures and processes that ensure the organisation's IT sustains and extends the organisations strategy and objectives	ITGI (2003)
IT Governance is the strategic alignment of IT with the business such that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management and risk management	Webb *et al.* (2006)

Table2.1: Definitions of IT Governance

Gerring (2001) recommends that, when faced with conceptual disarray, a researcher must consult classic work in the discipline and appropriate a definition or derive one using causal-explanatory techniques. For the purposes of this research, the following definition will apply: IT governance is concerned with strategic alignment and the management of IT resources, risks and performance to achieve IT value. This is consistent with the definition by Webb *et al.* (2006).

2.2.1 Relationship between Corporate Governance, IT Governance and IT Management

The literature emphasises the difference between IT governance and IT management and their relationship with corporate governance (De Haes & Van Grembergen, 2005; O'Donohue *et al.*, 2009). IT governance is concerned with the strategic aspects of IT, focuses on the entire firm and

is not about making specific decisions (ITGI, 2003; Van Grembergen & De Haes, 2008). This is consistent with the principles of governance outlined in section 2.1. IT governance is therefore the role of the board and executives (De Haes & Van Grembergen, 2008; ITGI, 2003).

In contrast, IT management is concerned with the efficient allocation and use of IT resources to support business processes to achieve business strategy (Chulani, *et. al*, 2006; De Haes & Van Grembergen, 2005). Therefore, it has internal focus and is concerned with short-term strategies and specific operational decisions about IT (De Haes & Van Grembergen, 2005; ITGI, 2003). IT management is an integral part of IT governance (Van Grembergen & De Haes, 2008). This is consistent with the functions of management as outlined in section 2.1.

The relationship between IT management, IT governance and corporate governance is shown in Figure 2.3. It may be concluded that IT management research and practices are an integral part of IT governance. This view will apply throughout this research. As with governance, IT management and IT governance functions may be vested in the same entity in smaller firms, but remain separate and distinct in larger firms.

Figure 2.3: Relationship between Corporate Governance, IT Governance and IT Management

2.2.2 Elements of IT Governance

Notwithstanding the disparities in definitions, there is agreement on the concept of IT governance as a mechanism for IT to contribute to achieving business strategy (De Daes & Van Grembergen, 2005; ITGI, 2003). Also inherent in the definitions are the elements of IT governance, i.e., structures, processes and relational mechanisms (Peterson, 2004). Figure 2.3 shows the relationship between IT governance and its constituent elements.

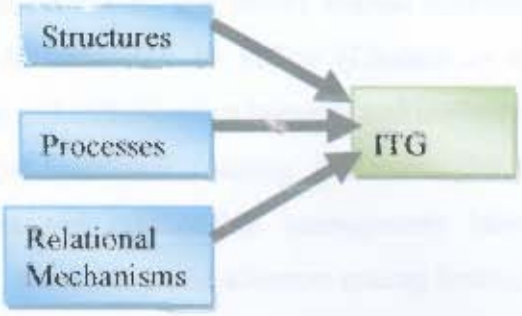

Figure 2.4: Elements of IT Governance (De Haes & Van Grembergen, 2005)

2.2.2.1 Structures

Decision-making structures are central to IT governance (Chulani, 2006; ITGI, 2003; Weill & Ross, 2004). This is consistent with governance. A structure consists of components, e.g., committees, positions, roles, and responsibilities (Chulani *et al.*, 2006). There is no ideal IT governance structure; on the contrary, organisational context determines the appropriate structure (Grembergen, 2005). According to Korac-Kakabadse and Korac-Kakabadse (2001b), factors such as size, resources and organisational culture, shape IT governance structures. Calder (2005) and ITGI (2003) recommend an independent committee, as an oversight mechanism.

2.2.2.2 Processes

A process is a collection of activities to achieve a strategy (Chulani *et al.*, 2007). Common examples of IT governance processes are strategic planning, prioritization of projects, allocation of resources, risk management, performance measurements and reporting (De Haes & Van Grembergen, 2005; Peterson, 2004). IT governance is complex, and a plethora of process frameworks and standards have emerged to facilitate its implementation. The most popular frameworks (i.e., Cobit, ITIL and ISO/IEC 27001) are outlined in section 2.2.4. Software applications for implementing IT governance are also available, e.g. Compuware and PlanView (Heir, Borgman & Maistry, 2007).

2.2.2.3 Relational Mechanisms

Structures and processes should be effectively coordinated and monitored to ensure IT resources are used efficiently to deliver maximum value (Peterson, 2004). This may be achieved with relationships between groups and procedures to accomplish processes. A relationship may be

formal or informal (Peterson, 2004). Formal relationships may be identified and codified as rules of acceptable behaviour or policy (Chulani *et al.*, 2007). Relational mechanisms include participation and collaboration between stakeholders, incentive and reward systems, and business and IT cross-functional training (Peterson, 2004; Van Grembergen & De Haes, 2008). Relationships and relationship management have gained primacy due to the growth in outsourcing, partnership and alliances among firms (ITGI, 2005a).

2.2.3 Domains of IT Governance

The overarching objective of IT governance is to manage risk and maximise IT value (ITGI, 2003; Jordan & Silcock, 2005). This may be accomplished through strategic alignment, resource management and performance management (Webb *et al.*, 2006). According to ITGI (2003), IT governance consists of the following domains: strategic alignment, risk management, resource management, performance management and value delivery.

2.2.3.1 Strategic Alignment

Strategic alignment is a measure of the extent to which a firm's IT strategy is aligned to its long-term business strategy (Luftman, Papp & Brier 1999). IT can be used to support business processes and engender new and superior strategies, culminating in improved IT performance (Avison, Jones, Powell, & Wilson, 2004; Feeny & Wilcocks, 1997). Although there are counter-arguments (Chan & Reich, 2007), it is generally agreed that firms which achieve strategic alignment outperform those which do not (Chan, Sabherwal & Thatcher, 2006).

Chan and Reich (2007) identify factors (e.g., size, industry and level of IT use) which impact on alignment. They report that smaller firms are well-aligned because of the high-level of communication. Teo and Ang (1999) found skilled IT employees and top management expertise and support enabled strategic alignment. Rockhart, Earl and Ross (1996) state that monitoring and education could lead to improved alignment.

2.2.3.2 IT Resource Management

IT governance is effective when "the organisation's IT resources are performing at their optimum" (Calder, 2005: pp. 145). Resource management is concerned with the appropriate investment in, and the effective allocation and use of, IT resources to achieve business strategy

(Calder, 2005; ITGI, 2003). IT resources include people, physical infrastructure, intellectual property, information, and IT relationships (ITGI, 2003; Weill & Ross, 2004). Appropriate investments include procurement of IT products and services, and the recruitment, development and retention of staff (ITGI, 2003).

Early studies in this area focused on IT structure and decision-making authority (Buckby *et al.*, 2009; Ein-Dor & Segev, 1982). Peterson (2004) discusses the importance of coordination to IT governance structures, outlined in section 2.2.2.3. The role of IT capabilities has also been highlighted. According to Agarwal (2006), firms with superior capabilities derive optimum benefits from their IT investments, compared to their competitors. Increasingly outsourcing and partnerships are being used to meet the day-to-day operational needs of firms. To determine the extents to which IT investments are meeting the desired goals, resources must be measured against predefined metrics (Calder, 2005; ITGI, 2003). Hamaker (2000) points out the need for regular inventory of IT resources.

2.2.3.3 IT Risk Management

An important component of IT governance is mitigation of risks. IT risks emanate from the way IT infrastructure, people and policies are governed (Westerman, 2004). The goal of risk management is to protect IT assets, mitigate risk and optimise opportunities for pursuing business strategies (Calder, 2005; Jordan & Silcock, 2005). Attendant to the growing dependence of firms on IT is the risk from investment and use. IT project failure, service disruptions, loss or exploitation of information assets, and infrastructure failure eventuate in value erosion (Jordan & Silcock, 2005). IT outsourcing also introduces risks (Bahil & Rivard, 2005). For example, incapable vendors, inappropriate contracts, and service failures constitute risks (Jordan & Silcock, 2005; Rohde, 2004).

Westerman (2004) classifies factors which promote effective risk management into risk process, infrastructure and capability. Risk process consists of effective policies and procedures for risk identification, assessment and mitigation; capability consists of the infrastructure and skilled expertise required to implement the risk process. It may be argued that the lack of infrastructure, skilled expertise and effective policies and procedures may accentuate a firm's vulnerability to threats.

2.2.3.4 IT Performance Management

IT performance management answers the question: "what benefits has IT contributed to the business"? It involves measuring the IT performance and the processes by which it is achieved (ITGI, 2003). Comparing the achieved and set objectives enables a firm to take corrective action (Brown, 2005; Grembergen, 2000). Performance management is linked to and carried out for strategic alignment, risk management, resource management and value delivery (Buckby *et al.*, 2009).

Traditionally, measurements have been in financial terms (Grembergen, 2000). However, recent advances have found this approach inadequate, and have recommended the inclusion of qualitative benefits (Calder, 2005). Consequently, multi-dimensional approaches, e.g., Balance Score Card, are being used to measure performance in terms of financial benefits, customer satisfaction, managerial effectiveness, internal business processes, learning and growth, etc. (Calder, 2005; ITGI, 2005b; Van Grembergen, 2000). Measuring IT performance is complex and fraught with poor methodologies, making it difficult to determine IT benefits (Brown, 2005; Tallon & Kraemer, 2003).

2.2.3.5 IT Value Delivery

The terms IT value, IT benefit, IT performance, IT impact and IT payoff are used interchangeably to refer to the contribution of IT to business performance (Devaraj & Kohli, 2004; Melville *et al.*, 2004; Tallon & Kraemer, 2003). A wide range of benefits, from financial to qualitative, may be derived from IT (Gregor *et al*, 2004; Melville *et al.*, 2004). This includes risk reduction, revenue increases, employee productivity and customer satisfaction. Tallon and Kraemer (2003) argue that top management is responsible for strategy, and thus, their perceptions should be considered in IT value research.

Not all IT investments yield the perceived benefits. According to Ward, De Hertogh and Viaene (2007), about 75 percent of IT projects fail to deliver value. This has been attributed to factors including approaches to benefits evaluation (Ward & Peppard, 2005). Based on data from prior research, they conclude that most firms either do not undertake benefit evaluation before and after investment or use inappropriate processes to determine benefits. Sohal and Fitzpatrick (2002) reported the lack of formal measurement of IT value. Schwabe and Bänninger (2008),

however, found benefit management activities, especially in justifying projects, notwithstanding the lack of formal processes.

Devaraj and Kohli (2004) discuss the lag time after which IT investment begins to pay off and which should be considered during evaluation. They point out that it takes about two to three years to develop the requisite capabilities to effectively use IT infrastructure. Brown and Grant (2005) state that IT value from investments vary across industry and firms. Ward and Peppard (2005) found that management support and allocation of responsibility contribute to value delivery.

2.2.4 IT Governance Frameworks

As shown in the literature, organisational context determines the appropriate IT governance framework in a firm. Korac-Kakabadse and Kakabadse (2001b) identify the following factors: how IT is used, the type of IT governance structure (e.g., centralised, decentralised or federal), regulations, standards and industry type. The growing involvement of boards has spawned the need for frameworks and standards to facilitate the implementation and use of IT governance (Larsen, Pedersen & Andersen, 2006). The most widely used implementation frameworks (i.e., ITIL, Cobit and ISO 27001) are briefly described below. None of the frameworks is all-encompassing. Schlarman (2004) therefore adjures firms to be eclectic in designing IT governance.

2.2.4.1 ITIL

IT Infrastructure Library (ITIL) is a code of best practices managed by the Office of Government of Commerce (OGC), United Kingdom (itSMF, 2007). It focuses on IT service, which includes IT assets and processes (Schlarman, 2004). ITIL consists of *Service Strategy*: a policy making and service strategy guide; *Service Design*: a guide for designing, developing and managing services; *Service Transition*: a guide for migrating services into organisations; *Service Operation*: a guide for managing and coordinating day-to-day IT service; and *Continual Service Improvement*: a performance management guide.

2.2.4.2 COBIT

Control Objectives for Information and related Technology (COBIT) is managed by the IT Governance Institute (ITGI). Cobit focuses on business processes (Schlarman, 2004). This framework consists of *Strategic Alignment*, *Resource Management*, *Risk Management*, *Performance Management* and *Value Delivery* (ITGI, 2003). These have been discussed in sections 2.2.3.1 to 2.2.3.5. Cobit provides controls for relevant IT processes, and control objectives and implementation directions for each control. A scaled-down version, called Cobit QuickStart, has been developed specifically for SMEs.

2.2.4.3 ISO 27001

The main focus of ISO 27001 is information security management (Calder, 2005). It is composed of Security Policy, Organisational Security, Asset Classification and Control, Personnel Security, Physical Environment Security, Communications and Operations Management, Access Control, Systems Development and Maintenance and Compliance. ISO 27001 consists of two parts: ISO 27001: 2005 and ISO 17799: 2005. The former contains guidelines for information security implementation and management in an organisation, while the latter is a support document, describing how to implement ISO 27001.

2.2.5 IT Governance: An Integrated View

Although evidence in the literature demonstrates that IT governance is complex and multifaceted (Mueller & Phillipson, 2007), it is *de rigueur* in research and practice to isolate and concentrate on distinct aspects (Avison *et al.*, 2004; Buckby *et al.*, 2009). However, other researchers advocate for a more integrated approach (Buckby *et al.*, 2009; Dahlberg & Kivijarvi, 2007). Dahlberg and Kivijarvi (2007) provide an integrated IT governance model.

2.2.6 IT Governance Research

IT governance research dates back about four decades (Brown & Grant, 2005; Sambamurthy & Zmud, 1999). According to Brown and Grant (2005) the term was first used by Loh and Venkatraman in 1993 but gained prominence in the late 1990s. While early research focused on locus of control and contingency factors, contemporary studies have combined these streams (Brown & Grant, 2004). Locus of control refers to where IT decision-making is located in the

firm (Peterson, 2004). This research stream focuses primarily on the relationship between organisational structure and IT performance, i.e., what structure leads to improved IT performance (Ein-Dor & Segev, 1982; Olson & Chervany, 1980). Three primary loci of control have been identified, namely: centralised, decentralised and federal.

On the other hand, the contingency stream acknowledges that IT governance "exists" within an organisational context, and therefore its implementation and effectiveness are influenced by managerial, organisational and external factors (Brown & Grant, 2005; Korac-Kakabadse & Korac-Kakabadse, 2001b; Sambamurthy & Zmud, 1999). These studies have evolved from individual to include multiple contingencies (Brown & Grant, 2005; Sambamurthy & Zmud, 1999). Various contingency factors have been identified and studied. These include industry, firm size, organisational and decision-making structures and business strategy (Brown & Grant, 2005; Sambamurthy & Zmud, 1999); social factors, e.g., shared domain knowledge and communication between business and IT managers (De Haes & Van Grembergen, 2008; Reich & Benbasat, 2000); absorptive capacity (Sambamurthy & Zmud, 1999); top management support (Ali & Green, 2005); and IT intensity (Ali & Green, 2005; Sohal & Fitzpatrick 2002). Weill and Ross (2004) observe that the following factors contribute to the differences in IT governance patterns: strategic and performance goals, organizational structure, governance experience, size, industry, and regional difference.

Weill and Ross (2004) provide a framework which combines governance structures (i.e., archetypes), decision domains, and rules for decision-making (i.e., which structure has decision input or decision right, and in which domain). They use a matrix to allocate decision input and decision right to structures in IT decision domains. This is illustrated in Table 2.2. The archetypes are represented as rows and decision domains (i.e., IT principles, IT architecture, IT Infrastructure, Business Applications and IT investments) as columns. The columns *I* and *D* allocate decision input and decision-making authority respectively to structures. For example the IT unit has input in IT principles domain, while Business has decision-making authority. In this way, the framework combines structures, decision-making and stakeholder participation.

Domain Archetype	IT Principles		IT Infrastructure		IT Architecture		Business Applications		IT Investments	
	I	D	I	D	I	D	I	D	I	D
Business Monopoly		X								
IT Monopoly	X									
Duopoly										
Federal										
Anarchy										

Table 2.2: IT Governance Framework (Weill & Ross, 2004)

In addition to contingency, other theoretical views of governance as outlined in section 2.1.2 have found application in IT governance research. Korac-Kakabadse and Korac-Kakabadse (2001b) discuss theories underlying IT governance, including agency, stakeholder, and a combination thereof, and conclude that the purpose or strategy should determine the appropriate model. Other researchers have investigated the practical implementation of, and identified critical success factor for, IT governance (Lee, Lee, Park & Jeong, 2008; Teo & Ang 1999). Table 2.3 summarises the managerial, organisational and external characteristics which have been identified in the literature to affect IT governance.

Characteristic	Source	Factor
Management expertise in IT governance	Weill & Ross (2004)	Managerial
Top management support in IT governance	Ali & Green (2005); Teo & Ang (1999) Thong & Yap (1995); Ward & Peppard (2005)	
Size	Brown & Grant (2005); Sambamurthy & Zmud (1999); Weill & Ross (2004)	Organisational
Organisational and IT structures	Brown & Grant (2005); Ein-Dor & Segev (1982); Sambamurthy & Zmud (1999); Weill & Ross (2004)	
Business strategy	Brown & Grant (2005); Weill & Ross (2004)	
Relationships	De Haes & Van Grembergen (2005); Peterson (2004)	
Shared understanding	De Haes & Van Grembergen (2005); Reich & Benbasat (2000)	
Communication between IT and business managers	De Haes & Van Grembergen (2005); Reich & Benbasat (2000)	
Processes	De Haes & Van Grembergen (2005); Peterson (2004)	
IT Intensity	Ali & Green (2005); Sohal & Fitzpatrick (2002)	
Location	Weill & Ross (2004)	External
Industry type	Brown & Grant (2005), Weill & Ross (2004)	
Regulation	Korac-Kakabadse & Korac-Kakabadse (2001b)	

Table 2.3: Factors Affecting IT Governance

2.2.7 IT Governance Practices

The Merriam-Webster dictionary defines practice as "the continuous exercise of a profession or an action". Boynton, Zmud and Jacobs (1994) describe IT management practice as the managerial efforts aimed at planning, organising, controlling and directing the introduction and use of IT within an organisation. In accordance with the governance practices outlined in section 2.1, and the working definition of IT governance adopted for this research, IT governance practices may be defined as "the repeated effort aimed at strategic alignment, and the management of risk, resources, and performance to ensure IT delivers value". Figure 2.5 illustrates the relationship between IT practices and IT value.

Figure 2.5: Relationship between IT Governance Practices and IT Value

2.3 IT in SME

2.3.1 Definition of SME

There is no consensus on what constitutes an SME. The generally accepted definitions are based on the number of employees, annual income and total assets (Burgess, 2002; Ghobadian & O'Regan, 2006). In South Africa, the National Small Business Act (NSBA, 1996) and the National Small Business Amendment Act (NSBAA, 2003) define SME by industry type in terms of the number of full time employees, total annual turnover or total asset value. For the purposes of this research, the first will apply. Accordingly, SMEs will be defined as firms which employ less than 200 full time employees. All the sectors under investigation (i.e., IT, finance, transport and retail) conform to this definition (NBSA, 1996, NBSA, 2003).

2.3.2 Sector Diversity

Researchers acknowledge that the SME sector is heterogeneous, consisting of a spectrum of firms with diverse characteristics, e.g., size, resources and industry type. Burgess (2002) and Martin and Matlay (2001) observe that, due to the foregoing differences, SMEs have different IT

requirements, intensity and processes. The diversity within the sector has implications for research. For example, a phenomenon may exist in different forms in different segments of the sector. Martin and Matlay (2001) warn against generalising findings across the sector and beyond the segment from which a sample was drawn. Thus, there is a growing advocacy for IT research to target selected niches and to differentiate between groups (Burgess, 2002).

2.3.3 Factors Affecting IT in SMEs

SMEs have unique characteristic which distinguish them from larger firms (Burgess, 2002; Holliday, 1995; Man *et al*, 2002, Pollard & Hayne, 1998). Southern and Tilley (2000) therefore propose that research involving SME should take cognisance of this difference. These unique characteristics, broadly classified as endogenous and exogenous, impact on the growth of SMEs (Storey, 1994). The former consists of management and organisational factors internal to, and within the control of, the firm. The latter, also called external factors, arise from the environment within which a firm operates, and are beyond its control.

The literature emphasises the need for research on IT in SMEs to focus on managerial, organisational and external characteristics of the firms. For example, Southern and Tilley (2002) contend that managerial practices, unique organisational demographics and external factors influence what and how IT is used. The researcher, however, acknowledges the list of characteristics to consider is inexhaustible. Consequently, the next section attempts to discuss those relevant to this research.

2.3.3.1 Managerial Factors

Evidence in the literature suggests that most SMEs are owned and managed by individuals or small groups of individuals. Researchers therefore emphasise the importance of the qualitative characteristics of the owners, managers or their equivalent (hereafter referred to as management) in relation to firm performance. Management is central to strategy setting and monitoring, decision-making, organisation and utilisation of resources, and relationship management, and therefore shapes the culture and practices in SMEs (D'Amboise & Muldowney 1988, Holliday, 1995). The extent to which these functions may be effectively accomplished depends on management characteristics, including educational and professional background, knowledge,

experience, motivation and goals (Storey, 1994). It may be concluded that management characteristics influence the governance practices in SMEs.

The role of management in the acquisition and use of IT in SMEs is manifest in the literature. Blackburn and McClure (1998) note that management influences what and how IT is applied to business processes, and their characteristics impact on IT value. Empirical studies have linked managerial characteristics such as attitude, IT expertise, involvement in activities of the firm, readiness to train employees, and managerial approach (Blackburn & McClure, 1998; Burgess, 2002; Fink, 1998; Thong & Yap, 1995) to improved IT value. On the other hand, Southern and Tilley (2000) claim that SMEs lack the managerial expertise to determine what and how IT may be applied to business processes. This is corroborated by Burgess (2002) who observes that SME managers lack strategic management, understanding of the benefits of IT, and the expertise to measure these benefits. These may hinder IT value delivery.

The position of a manager in an organisation has also been well-researched, as it is known to influence power dynamics and decision-making. For example, Seyal, Rahim and Rahman (2000) investigated the relationship between position and IT usage.

There are conflicting reports in the literature on the effect of gender on management style and organisational practices. This has permeated research into gender differences in IT use and decision-making. For example, Matlay and Martin (2001) report differences in the perception of IT value by gender. Chuang, Nakatani, Chen and Huang (2007), however, found no differences in electronic commerce adoption.

2.3.3.2 Organisational Factors

Lighthelm and Cant (2002) observe that organisational shortcomings are the primary cause of SMEs failure. Storey (1994) identifies age, size, resources and organisational structures as some of the factors which impact on the growth of SMEs. Studies in strategic management conclude that unique resources and organisational capabilities are antecedents to competitive advantage (Grant, 1991). That firms need appropriate resources to achieve their strategies is self-evident. However, it is argued that it is not the resource *per se,* but how it is used, that gives firms competitive advantage over others.

Grant (1991) posits that an organisational capability is what a firm can do with a set of resources working together. The extent to which a firm can perform organisational processes (e.g., strategy formulation, performance monitoring and the coordination between people, and between people and other resources) is contingent on factors such as general business management, and strategic and technical expertise. It is these factors, *caeteris parabus*, which confer competitive advantage. This supports findings from IT value studies which conclude that it is not the IT resource *per se*, but its use and management, that gives competitive advantage (Powell & Dent-Micallef, 1997; Levy & Powell 2005). The role of managerial IT expertise has been explicated in the foregoing section and need not be re-emphasised.

Mata, Fuerst and Barney (1995) submit that firms need technical IT expertise, in addition to managerial IT skills, to derive value from IT. IT infrastructure and technical expertise, and effective processes depend on organisational demographics, including the size, age and structure. Man *et al.* (2002) and (Rogerson, 2000) claim that there is a link between employees' skills and business performance. Ein-Dor and Segev (1982) observe that adequate resources may increase the likelihood of IT success. Caldeira and Ward (2003) and Mehrtens, Cragg and Mills (2001) also highlight the need for technical IT skills. However, as a consequence of their small size, SMEs lack financial resources, IT infrastructure and technical IT expertise (Burgess, 2002; Fink, 1998).

The size of a firm determines its characteristics (e.g. size of business operations, infrastructure, expertise, and organisational structure) which also determine what, and how, IT may be used. Thong and Yap (1995) argue that larger SMEs are more likely to acquire IT infrastructure and expertise due to the size of their operations. In addition, larger SMEs are more likely to have the expertise to identify the benefits of, and effectively use, IT to achieve business value. Gregor *et al.* (2004), however, found no relationship between firm size and IT value.

Age (i.e., the length of time in existence) may enable a firm to accumulate experience and resources, develop relationships with, and gain reputation from, other firms. De Lone (1988) reports that the age of a firm and the number of years it has been using IT are likely to affect what and how IT is used. Fink (1998) notes that firms with more IT experience are more likely to acquire IT.

Organisational structure delineates, and establishes relationships among, the parts of an organisation (Currie, 1995). Relationship involves the coordination and monitoring of these parts through communication, policies, rules and regulations (see section 2.1). Structure influences processes and relationships: it determines the appropriate processes and relational mechanisms. Organisational structure may be measured by the degree of centralisation of decision-making, specialisation of functions, and formalisation of rules and procedures (Ifinedo & Nahar, 2009).

SMEs are characterised by simpler, flatter organisational structures; fewer functional units; centralised decision-making and informal organisational processes. The small size and management involvement in IT decision-making enable SMEs to respond quicker to external changes and promote flexible and innovative adoption and use of IT to gain competitive advantage (Levy, Powell & Yetton, 2003; Premkumar, 2003).

Informal relationships engender a culture of support among employees, which promotes informal organisational processes, e.g., communication, learning and training (Burgess, 2002), and creates an enabling environment for the development of IT expertise. However, the lack of formal processes may impact on compliance with policies and standards. Holliday (1995) found that SMEs do not adhere to standards. According to Burgess (2002), SMEs lack formal planning or control procedures. Southern and Tilley (2000) found that the degree of formalisation depended on the level of IT usage, and that high usage SMEs have formal IT structures and processes, and often dedicated employee (e.g., IT manager) responsible for the IT function.

The effect of IT structure on IT in SMEs has been well-studied. Ein-Dor and Segev (1982) operationalised IT structure as centralised, decentralised and combined. Prasad, Heales and Green (2009) contend that the presence of a dedicated IT department may affect IT governance. Huang, Zmud and Price (2009) argue that centralised IT structure improves IT governance success in SMEs.

2.3.3.3 External Factors

The lack of resources makes SMEs more susceptible to external influences than larger firms (D'Ambrose & Muldowey, 1988; Man *et al.* (2002). Thus, a firm's growth depends on the extent to which its management is able to deal with external factors, e.g., government legislation and

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agencies, industry type, location, and relationships with customers and suppliers (D'Ambrose & Muldowey, 1988; Lighthelm & Cant, 2002). The role of legislation and government agencies in providing IT support to SMEs is recognised in the literature. However, it has been observed that SMEs are unaware of such support mechanisms (Harindranath *et al.*, 2008). It is also acknowledged that the administrative cost of compliance is prohibitive for SMEs (Hudson, 2003; Lighthelm & Cant, 2002).

The lack of IT infrastructure and expertise makes SMEs more dependent on external agencies (e.g., vendors, consultants and government agencies) for expertise and services (Fink, 1998; Premkumar, 2003). Increasingly, firms have resorted to IT outsourcing to address the shortfall. Outsourcing introduces risks, which have to be managed (Devos, Landeghem & Deschoolmeester, 2008; ITGI, 2005a). These risks include poor management and lack of expertise (Earl, 1996). Rohde (2003) observes that SMEs lack both the financial resources and expertise to effectively manage outsourcing.

Geographical differences in resources, markets and expertise have implications for what and how resources may be used in SMEs. For example firms are known to derive benefits (e.g., spatial proximity, collaboration, cooperation, learning, competition and innovation, and specialised expertise) from industrial clusters. Recent studies have found that rural firms, compared to urban, are more likely to experience IT failure (MacGregor & Vrazalic, 2007). Martin and Matlay (2001) contend that SMEs in urban areas are likely to possess the requisite infrastructure, internal IT expertise, and external support than those in rural areas. Burgess (2002) contends that geographical differences in resources and culture affect the use of IT in SMEs.

Industry type and business operations have been reported to influence IT in SMEs. Burgess (2002) concludes that there is a relationship between the industry within which a firm operates and the type of IT used. Seyal *et al.* (2000) found that firms in the financial sector are more likely to have higher IT intensity than those in the manufacturing sector. Kankanhalli *et al.* (2003) found that firms in the financial sector implement adequate IT security measures.

Table 2.4 summarises the managerial, organisational and external characteristics of SMEs which impact on the acquisition and use of IT.

Characteristic	Source	Factor
Position in organisation	Seyal *et al.* (2000)	Managerial
IT expertise and experience (from professional and educational background, etc.)	Blackburn & McClure (1998); Burgess (2002); Fink (1998); Thong & Yap (1995)	
Management involvement and support (including decision-making, training, etc.)	Blackburn & McClure (1998); Burgess (2002); Thong *et al.* (1996); Thong & Yap (1995)	
Gender	Matlay & Martin (2001); Chuang *et al.* (2007)	
Size	De Lone (1988); Ein-Dor & Segev (1982)	Organisational
Age	De Lone (1988)	
Years operating computers	De Lone (1988)	
IT Capabilities (infrastructure, employees IT skills, processes)	Caldeira & Ward (2003); Prasad, Heales & Green (2009)	
Organisational and IT structures	Currie (1995); Ein-Dor & Segev (1982)	
Relationships (communication, learning, training, etc.)	Burgess (2002); Van Grembergen & De Haes (2008)	
Location	Burgess (2002); Martin & Matlay (2001)	External
Sector	Burgess (2002); Martin & Matlay (2001)	
External agencies (e.g. government agencies, vendors)	Fink (1998); Premkumar, 2003	
Government support (regulation, national agencies, etc.)	Burgess (2002)	

Table 2.4: Factors Affecting IT in SMEs

SMEs in South Africa are also beset by resource poverty and the attendant barriers to IT use. Brink *et al.* (2003) discuss external and internal factors which adversely affect their success. These include rapidly changing technology, high cost of compliance with regulation, and the lack of resources and management expertise. Differences between rural and urban firms have also been reported (Kyobe, 2009, citing Orford *et al.*, 2004). The barriers to IT use in SMEs are also well-documented: Kyobe (2004) found that SMEs do not use IT resources effectively; Sewry and Upfold (2005) reported inadequate security measures; Kyobe (2009) reported the lack

of compliance with IT regulation. Thus, this research is relevant to South African SMEs, which could leverage IT governance to improve IT value delivery.

The review of literature has established the need to conduct research into IT governance and IT in SMEs from managerial, organisational and external perspectives. To this end, the concepts identified in Tables 2.3 and Table 2.4 were synthesised to produce a conceptual model to guide the research.

2.4 Conceptual Model

A conceptual framework logically describes the relationship among concepts relevant to the phenomenon under investigation (Cavana *et al* , 2001). As indicated in Chapter 1, the purpose of this research is to gain insight into IT governance practices in SMEs. The main objectives are to identify the managerial, organisational and external factors which impact on IT governance practices and to establish the relationship between these practices and IT value. Figure 2.6 shows the conceptual model, which forms the basis for organising the measurement, collection and analysis of data (Oates, 2006; Cavana *et al*., 2001).

Figure 2.6: Conceptual Framework

2.5 Research Propositions

The distinction between proposition and hypothesis is ambiguous in the literature (Cooper & Schindler, 2003). According to Gerring (2001), a proposition is a general statement about the empirical world which can be established as true or false. On the other hand, a hypothesis is formulated for testing (Cooper & Schindler, 1998). Ghauri and Grønhaug (2002) indicate that hypotheses are appropriate when the phenomenon is well-researched and theories and concepts

are well-defined. IT governance in SMEs is neither well-researched, and nor are the concepts well-defined.

Therefore, propositions have been adopted for this research. Gerring (2001) recommends that propositions must be precise, parsimonious, coherent, and relevant. Precision attends to accuracy and consistency of propositions, parsimony to simplicity, and coherence to logical relationship among statements. It may be concluded that propositions are accurate, unambiguous, simple, and summarised statements which are logically related to each other and relevant to the phenomenon under investigation.

Subsequent to the review of literature, and based on the conceptual model, the following propositions are presented for investigation. The factors in Table 2.5 were identified for investigation to establish their influence on IT governance practices. It may be observed that Propositions 1 to 3 are related to Research Objective 2 (the factors which influence IT governance practices), and Proposition 4 to Research Objective 3 (i.e., the relationship between IT governance practices and IT value). Proposition 5 seeks to corroborate the responses from the same firm.

Factors	Aspect of firm
Position, experience (professional background and experience in general and IT management), and gender	Managerial
Firm size, age, experience in using IT (computers), adequate infrastructure, IT structure	Organisational
Province, Industry type,	External

Table 2.5: Factors Under Investigation

Proposition 1: Managerial characteristics are likely to influence IT governance practices

Proposition 1A: Management position is likely to influence IT governance practices

Proposition 1B: Professional background is likely to influence IT governance practices

Proposition 1C: Number of years in management position is likely to influence IT governance practices

Proposition 1D: Number of years in IT management position is likely to influence IT governance practices

Proposition 1E:The gender of a manager is likely to influence IT governance practices

Proposition 2: Organisational characteristics of a firm are likely to influence IT governance practices

Proposition 2A: Firm size is likely to influence IT governance practice

Proposition 2B: The age of a firm is likely to influence IT governance practices

Proposition 2C: Years of using computers is likely to influence IT governance practices

Proposition 2D: IT structure is likely to influences IT governance practices

Proposition 3: External characteristics of a firm are likely to influence IT governance practices

Proposition 3A: The location of a firm is likely to influence IT governance practices

Proposition 3B: The industry type is likely to influence IT governance practices

Proposition 4: There is a link between IT governance practices and IT Value

Proposition 4A: There is a link between Strategic Alignment and IT value

Proposition 4B: There is a link between IT Risk Management and IT value

Proposition 4C: There is a link between IT Resource Management and IT value

Proposition 4D: There is a link between IT Performance Management and IT value

Proposition 5: There is no difference between responses from the same firm

Summary of Chapter

This chapter analysed existing literature to identify the relevant theories and concepts for solving the problem under investigation. It traced the origins and discussed the elements and domains of IT governance. A review of the literature established the need to investigate IT governance and SMEs from managerial, organisational and external perspectives. Concepts from IT governance and IT in SMEs were synthesised to develop a conceptual model to guide the conduct of this research. Based on the model and the research objectives, a set of characteristics were identified for investigation and research propositions were formulated. The next chapter presents research design. It discusses the research philosophy and paradigm, the overall strategy for implementation, and the data collection and analysis techniques adopted for this research.

Chapter 3: Research Design

According to Durrheim (2004), the research process consists of four broad stages: problem definition, research design, execution and report writing. In the preceding chapters, the research problem and its theoretical context were defined and the concepts of interests and their relationships were identified. This chapter presents the research design. It describes the strategic and operational plans, and the decision choices which guided the research process to ensure valid and reliable results (Ghauri & Grønhaug, 2002).

This chapter consists of the following sections: *3.1 Research Philosophies* discusses philosophical assumptions which underpin research; *3.2 Research Paradigms* provides an overview of the dominant paradigms in IS research; *3.3 Types of Research* describes the fit between research type, purpose and methodology, and sets the background for the choice of research strategy and methods; *3.4 Methodology for this Research* describes the research strategy, unit of analysis, sampling technique, and data collection and analysis methods; and *3.5 Research Ethics* articulates the researcher's own ethical duties and those relating to the researcher, the research participants and other stakeholders.

3.1 Research Philosophies

Researchers base the design and conduct of their investigation on beliefs and assumptions about what is to be known (i.e., the research problem), what constitutes valid evidence, and how the evidence may be acquired in the context of practical constraints, e.g., legal, institutional and economic issues, and the researcher's own skills and interests (Ghauri & Grønhaug, 2002; Orlikowski & Baroudi, 1991; Terre Blanche & Durrheim, 2004). For example, the philosophies to which a researcher subscribes may determine the nature of research questions to investigate. Similarly, the nature of research questions to be answered may shape the beliefs and assumptions underlying the investigation. Figure 3.1 shows the relationship between research problems, practical constraints and research philosophies.

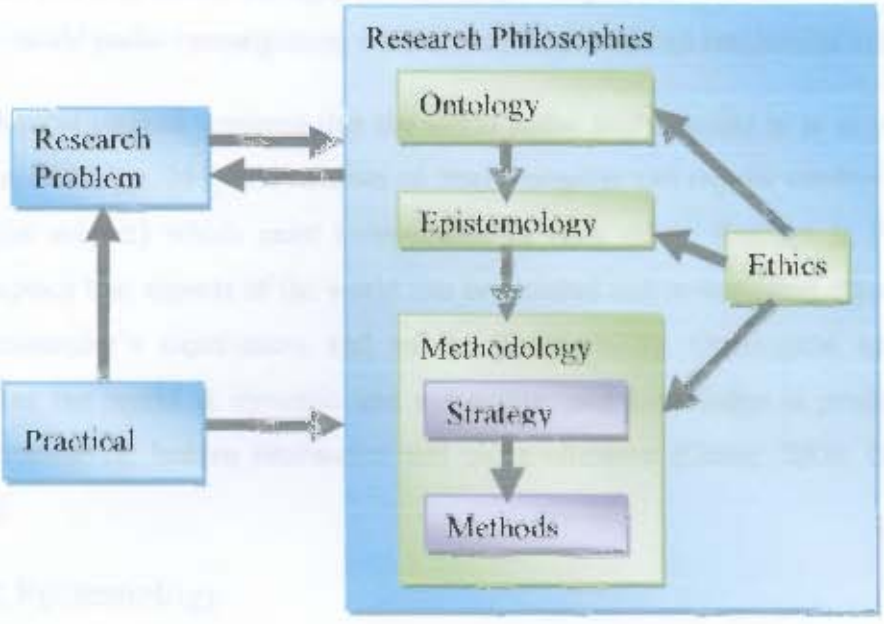

Figure 3.1: Philosophical Assumptions in Research Design (Adapted from Ghauri & Grønhaug, 2002; Scott & Morrisson, 2005)

Mingers (2001) and Wolenski (2004) discuss the elements of research philosophy, namely: ontology, epistemology, methodology and ethics. Various scholars have established the relationship between the first three elements (Oates, 2006; Scott & Morrison, 2005). Niiniluoto (1999) points out the need to supplement methodology with an investigation into the legitimate or permissible (i.e., what is ethical). Ethics is closely linked to methodology, epistemology and ontology. For example, it may determine what is to be known (i.e., what kind of problems to investigate) and how. Ethics is concerned with the duties of the researcher to the research participants on one hand, and to the intended research audience on the other (Ghauri & Grønhaug, 2002; Oates, 2006). Ontology, epistemology and methodology are discussed in sections 3.1.1 to 3.1.3, and research ethics in section 3.5.

3.1.1 Ontology

Ontology is the study of the nature of being, i.e., existence or reality (Stahl, 2008). It answers the question: what kinds of things exist, and how do they interact in the world under investigation (Durhheim, 2004)? Ontological beliefs are based on the structure of the phenomenon and its relationship with other phenomena and with the researcher. It may be broadly divided into two:

contrast, realism assumes that what can be discovered or known is singular or universal, independent of the researcher, and applies across time and context (Oates, 2006).

3.1.3 Methodology

Methodology specifies how the researcher may go about practically investigating a phenomenon to gain knowledge (Terre Blanche & Durrheim, 2004). It consists of strategy (i.e., the overall approach to answering the question) and methods for collecting and analysing data (Oates, 2006). This is shown in Figure 3.1. According to Scott and Morrison (2005), it is through methodology that the researcher provides justification or proof of validity to the research audience.

Ontological and epistemological assumptions determine the choice of strategies, which in turn influence the choice of data collection and analysis methods (Oates, 2006). For example, if the purpose of an investigation is to acquire multiple views about a phenomenon, then strategies and methods that do not lend themselves to multiple views may not be appropriate (Scott & Morrison, 2005). Oates (2006) discusses research strategies and methods commonly used in IS research. The strategies include experiment, survey, design and creation, ethnography, case study and action research; the data collection methods include interview, observation, questionnaire and documents; and the data analysis methods include statistical techniques and qualitative analysis. In general, some methods are well-suited to specific research strategies. For example, observation is widely used in experiment, and questionnaire in survey.

Research methods are broadly divided into quantitative and qualitative. The distinction is based on the ontological, epistemological and strategic assumptions to which they are well-suited, and not the type of data *per se* (Guba & Lincoln, 1994; Thorne, 2000). This is supported by Ghauri and Grønhaug (2002: pp. 86) who observe that the difference is not only about quantification of data, but also differences in "perspectives on knowledge and research objectives". Table 3.1 distinguishes between quantitative and qualitative methods based on ontological, epistemological and methodological assumptions.

Characteristic	Quantitative	Qualitative
Ontology and epistemology	Based on ontological and epistemological realism	Based on ontological and epistemological antirealism
Strategy	Objective, standardised approach to observing the phenomenon	Subjective, analytical approach to inductively explore the phenomenon
Data collection method	Measurement of specific characteristics of the phenomenon	Holistic view of the phenomenon Data coded as themes, concepts and categories.
Data analysis method	Data represented as numeric (quantitative) and analysed by statistical techniques	Findings are subject to researcher's interpretation

Table 3.1: Quantitative and Qualitative Methods (Adapted from Cavana et al. 2002; Ghauri & Grønhaug, 2002)

3.1.3.1 Quantitative Methods

Quantitative methods are typically used in research based on ontological and epistemological realism. The key characteristics are objective observation, quantitative measurements and statistical analysis (Cavana *et al.*, 2001). Quantitative data collection methods allow the researchers to identify specific characteristics of the phenomenon under investigation, and to objectively and systematically measure and collect data, usually coded in numeric form. Statistical techniques are subsequently used for data analysis and reporting findings. Quantitative methods are generally deductive and use experiment and survey strategies with observation, questionnaire, documents and interview as data collection methods.

3.1.3.2 Qualitative Methods

In contrast, qualitative methods are well-suited to research strategies underpinned by ontological and epistemological antirealism. The key characteristic is 'inducing' valid data, and not objective and systematic measurements. The researchers immerse themselves in the data collection and analysis processes, continuously making rational decisions about what may constitute valid data to answer research questions (Myers, 1997; Thorne, 2000). Unlike quantitative methods, the data collection and analysis methods may not be distinct. Often, ethnography, case study and action research strategies are employed to collect non-numeric data through interviews, observation and documents (Myers, 1997; Oates, 2006). Although there are many different qualitative analysis methods, they are similar in approach: organising the raw data, perusal, classification, and synthesis (Leedy & Ormrod, 2005 citing Creswell, 1998).

3.2 Research Paradigms

A paradigm is a "set of shared assumptions or a way of thinking about some aspect of the world" (Oates, 2006: pp. 282). It is defined along three dimensions, namely: ontology, epistemology and methodology (Terre Blanche & Durrheim, 2004). Oates (2006), Orlikowski and Baroudi (1991) and Myers (1997) identify three overarching paradigms in IS research. These are summarised in Table 3.2. It may be observed that some paradigms are naturally underpinned by specific research philosophies.

Paradigm	Ontology	Epistemology	Methodology
Positivist	The phenomenon under investigation is independent and objective	Knowledge exists independent of the researcher and can be acquired objectively	Quantitative data collection and analysis methods; deductive, hypothesis testing; generalisation; associated with sample survey
Interpretive	The phenomenon under investigation is not independent but exists in conjunction with others, and is subject to human perception	Knowledge is constructed through human perception; the researcher is not a passive observer	Researcher interacts with the research context and is part of the research process; analytical data collection and analysis methods to "induce" data and generate theory
Critical	Similar to interpretive; in addition, it assumes the phenomenon dominates and exploits subjects	Similar to interpretive; in addition, the researcher is critical and aims to change the *status quo*	Similar to interpretive; in addition, the processes are critical

Table 3.2: Research Paradigms (Cavana et al., 2001; Terre Blanche & Durrheim, 2004)

3.2.1 Positivist Research Paradigm

The positivist paradigm derives from the natural sciences, and is premised on ontological and epistemological realism. Its key characteristics include quantifiable measurement, models (e.g., formal propositions and hypothesis) and universal laws, i.e., generalisation (Myers, 1997; Oates, 2006). Validity and reliability of findings, therefore, depend on precise measurements, accurate models and representative samples (Mitchell & Jolley, 2007). Quantitative methods (i.e., experiments and surveys strategies with observation and questionnaire as data collection

methods, and statistical techniques for data analysis) are generally employed (Oates, 2006; Orlikowski & Baroudi, 1991).

Positivist research has been widely criticised for its underlying reductionist, nomothetic, generalisability and repeatability assumptions, which limit what knowledge can be gained (Oates, 2006). Its detractors assert that complex problems cannot be reduced to a limited set of factors, while disregarding others which may be relevant; precise measurements are often unattainable; different people see the world differently; research context may differ and, therefore, canonical approaches may not be applicable. This paradigm, however, is well-suited to research which involves large samples and testing (Mitchell & Jolley, 2007; Oates, 2006).

3.2.2 Interpretive Research Paradigm

The interpretive paradigm is based on ontological and epistemological antirealism, as outlined above. It seeks to describe, interpret, analyse and understand phenomena (Orlikowski & Baroudi, 1991). Thus, the appropriate research methods are ethnography, case study and action research, which recognise researchers' interaction and the unique context of the world under investigation (Oates, 2006). Qualitative methods are widely used to gather, construct and present multiple perspectives of knowledge (Leedy & Ormrod, 2005; Oates, 2006).

Critics argue that the interpretive paradigm is unscientific and susceptible to researcher bias. It is also criticised for focusing on understanding, and not questioning the *status quo*. However, it is effective in cases where the research involves smaller samples and the purpose is to gain in-depth knowledge (Oates, 2006).

3.2.3 Critical Research Paradigm

The main purpose of the critical paradigm is social critique (Myers, 1997). According to Orlikowski and Baroudi (1991: pp. 15), "critical researchers attempt to critically evaluate and transform the social reality under investigation". Although there are clear similarities between the interpretive and critical paradigm (i.e., similar ontological and epistemological assumptions), the latter emphasises changes to the *status quo* and seeks to empower people by helping to eliminate causes of alienation and domination (Myers, 1997; Oates, 2006). It is however

criticised for, among other things, the lack of criteria for judging research (Oates 2006; Orlikowski & Baroudi, 1991).

3.2.4 Which Paradigm to Choose?

There is an ongoing debate on what constitutes an appropriate research paradigm. One school of thought holds that paradigms are distinct and incommensurable, and therefore mutually exclusive (Minger 2001; Oates, 2006). Another, however, contends that paradigms have their shortcomings (e.g., assumptions about independence and objectivity may be inaccurate) and propose paradigm pluralism to compensate for their fallibility (Mouton, 2006). A third view acknowledges that "the boundaries between paradigms are not clear cut" but permeable at the edges and advocate the pragmatic selection of strategies and methods from paradigms to suit research problems (Terre Blanche & Durrheim, 2004: pp. 168).

The above-stated debate has pervaded IS. Researchers are therefore adjured to apply pluralism of methods, strategies and paradigms to gain better perspectives of phenomena (Goles & Hirschheim, 2000; Mingers, 2001; Orlikowski & Baroudi, 1991). The positivist paradigm is dominant in IS research, notwithstanding the steady growth in the use of the other paradigms (Chen & Hirschheim, 2004; Orlikowski & Baroudi, 1991).

3.3 Types of Research

As shown in Figure 3.1, philosophical assumptions may determine the research purpose and what problem may be investigated and *vice versa*. The type of conclusions to be drawn from a research also reflects its purpose (Durrheim, 2004). Research may be classified into exploratory, descriptive and explanatory or causal (Cavana *et al*, 2001; Ghauri & Grønhaug, 2002; Hussey & Hussey, 1997). This is shown in Table 3.3. Cavana *et al.* (2001) and (Durrheim, 2004), however, point out that the distinctions are not clear-cut. It may be observed that the type of research influences the choice of research strategy and method, and therefore, paradigm.

	Exploratory	Descriptive	Explanatory (Causal)
Purpose	To better understand a phenomenon	To establish and describe factors associated with a phenomenon	To explain relationships and differences among factors associated with a phenomenon
Nature of phenomenon	Not structured; not well-defined or studied	Structured; well-defined or studied	Well-structured, and well-studied
Data gathering	Qualitative methods, e.g., observations, unstructured interviews and focus groups, which seek to understand phenomenon	Quantitative methods, typically questionnaires but sometimes structured qualitative methods, e.g., structured interviews and structured focus groups	Quantitative methods using structured questionnaire, field and laboratory experiments
Data Analysis	Qualitative methods to understand the problem, followed by rigorous research to gain in-depth knowledge	Quantitative statistical analysis (frequency, mean, median, etc.) to summarise and describe data	Quantitative analysis (inference or confirmatory)
Outcomes	Used to formulate theories	Used to build a profile of the factors of interest; data facilitates understanding, and provides ideas for further decision-making	Enables cause(s) to be isolated to determine their effect(s)
Suitability	Typically used in interpretive and critical research	Positivist research, but sometimes in interpretive and critical	Mostly positivist research

Table 3.3: Types of research (Cavana et al, 2001; Ghauri & Grønhaug, 2002; Hussey &Hussey, 1997)

3.4 Methodology for this Research

The next stage in the research process, after defining the research purpose and type, is to select the strategies and methods (Cavana *et al.*, 2001). As explained above, a research methodology must be congruous to the purpose. Although IT governance may not be well-defined, as evidenced by the "conceptual disarray" in definitions, it has been well-studied and a large body of knowledge has been accumulated. Studies by professional bodies and academics have contributed to the theoretical and conceptual understanding of the field.

However, IT governance in SMEs has not been well-studied and not much is known of the practices thereof. As outlined in Chapter 1, the purpose of this research is to gain insight into IT governance practices by describing the *status quo*. To accomplish this, characteristics of IT governance in the sector must be identified, quantified and measured. A positivist, descriptive and quantitative survey research was, therefore, considered appropriate.

3.4.1 Descriptive Research

Table 3.3 summarises the characteristics of descriptive research. It is appropriate if the purpose of the research is to identify and describe specific characteristics of the phenomenon under investigation (Cavana *et al.*, 2001, Ghauri & Grønhaug, 2002; Hussey & Hussey, 1997). Descriptive research answers questions such as: "what", "to what extent", "how many" and "how much" (Pinsonneault & Krammer, 1993) and, thus, lends itself to quantitative methods for gaining understanding of the characteristics of organisations with common practices (Cavana *et al.*, 2001). These are congruent to the purpose of this research.

Its main drawback is that it cannot answer "why" questions, i.e., it cannot establish causal relationships because it does not account for confounding variables (Leedy & Ormrod, 2005). However, by establishing the "what", it precipitates the need to find "why" (Mitchell & Jolley, 2007). Interpretation is therefore an essential component (Leedy & Ormrod 2005). It is incumbent on the researcher to explain the findings to the research audience.

The unit of analysis (i.e., the object of investigation and about which conclusions may be drawn) influences the types of conclusions, and therefore, the research purpose (Durhheim, 2004). This research investigated and drew conclusions about SMEs (i.e., organisations), and so a larger sample was required for the conclusions to be accurate. A survey was, therefore, the appropriate strategy. A questionnaire for data collection and statistical techniques for data analysis enabled the factors of interest to be identified, described, and tested for correlations. Survey and test of correlation are commonly employed in descriptive research (Leedy & Ormrod, 2005).

3.4.2 Survey

The purpose of a survey is to gain insight about a large population by investigating a sample (Leedy & Ormrod, 2005; Rea & Parker, 1997). It allows the same kind of data to be collected

from a large group of people or events in a standard and systematic manner (Oates, 2006). Typically, quantitative methods are employed: questionnaire for data collection and statistical methods for data analysis and reporting findings. This strategy is, therefore, well-suited to the purpose of this research. A survey is easier to administer, in terms of cost and time, and can be replicated over different groups, times and places for comparison (Newsted, Huff & Munro, 1998; Oates, 2006). It may be classified, according to duration, into cross-sectional and longitudinal survey. The former collects data on the units of analysis over a specified period of time, while the latter is over a long period of time (Chen & Hirschheim, 2004; Leedy & Ormrod, 2005).

A survey as a strategy, however, has inherent weaknesses. It is ineffective when a detailed understanding of context and history of a phenomenon is required (Oates, 2006; Pinsonneault & Kraemer, 1993). In addition, it relies on self-reporting, which may result in response bias (Leedy & Ormrod, 2005; Rea & Parker).

This research was to be completed in a specified period. Consequently, a descriptive, cross-sectional survey was considered appropriate. The IS research literature concludes that cross-sectional survey is the most dominant strategy (Orlikowski & Baroudi, 1991; Chen & Hirschheim, 2004). It has been used to investigate IT governance (Ali & Green, 2005; ITGI, 2006; ITGI, 2009; Lee *et al.*, 2008; Prasad *et al*, 2009). However, cross-sectional survey, unlike longitudinal, offers weak evidence of cause and effect (Leedy & Ormrod, 2005; Gable, 1994).

Central to descriptive survey are measurements and statistical analysis. Reliability and validity of instruments are, therefore, important issues. The research design endeavoured to reduce errors and biases in sampling, measurements and data analysis to assure reliability and validity. The following sections describe the sampling and data collection and analysis processes.

3.4.3 Sampling

A representative sample is essential to descriptive survey. It enhances the accuracy of findings and generalisation (Ghauri & Grønhaug, 2002). Figure 3.2 shows the sampling process. According to Oates (2006), an accurate and appropriate target population, sample frame and sampling technique, and a sufficiently large sample size reduce sampling bias, and consequently, improve representativeness of sample.

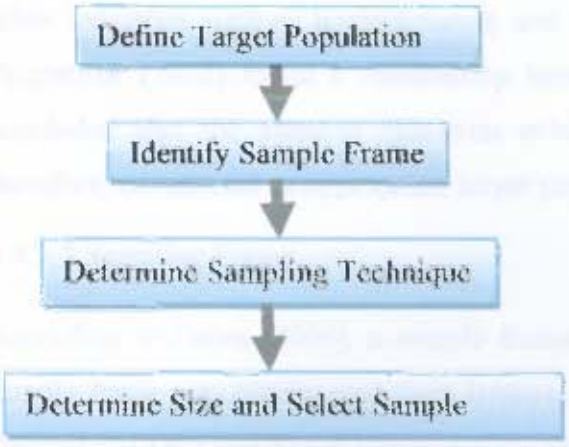

Figure 3.2: Sampling Process (Ghauri & Grønhaug, 2002; Hussey & Hussey, 1997)

3.4.3.1 Target Population

The diversity in the SME sector and, the advocacy for IT research to target selected niches and to differentiate between industries has been outlined in section 2.3.2. The unit of analysis has been identified as the firm. Thus, in accordance with the definition of SMEs, the target population was firms with less than 200 employees. In addition, only firms in the IT, finance, transport and retail industries in the Western Cape, Eastern Cape and Gauteng provinces of South Africa were considered.

Owing to economic constraints (Cavana *et al.*, 2001; Oates, 2006), the survey could not cover all provinces. The above-mentioned were selected for three reasons. First, 46 and 18 percent (a total of 64 percent) of SMEs in South Africa are in Gauteng and Western Cape respectively (RIA!, 2006). Second, these provinces have well-developed IT infrastructure, technical expertise, and support from academic institutions, vendors and consultants, and government institutions. Thus, SMEs in these provinces may derive benefit from their location, as outlined in section 2.3.3.3. Lastly, the Eastern Cape is less developed with less infrastructure and technical expertise. The three provinces account for about two-thirds of SMEs in South Africa, and therefore is representative of the firms in the sector. The differences in location also allows for comparisons.

The IT, finance, transport and retail sectors were selected heedful of the request for SME research to consider different industries. Studies have established that different industries have different needs, use and roles for IT (Kankanhalli, Teo, Tan & Wei, 2003). Seyal *et al.* (2000)

indicate that IT intensity in goods and or service organizations is comparatively higher than in other industries such as manufacturing and distribution. Ali and Green (2005) and Sohal and Fitzpatrick (2002) found a relationship between IT intensity and IT governance. It may be concluded that the selected industries exhibited the characteristics to be investigated and, therefore, constituted an appropriate target population.

3.4.3.2 Sampling Frame

According to Oates (2006), a sample frame must be appropriate, up-to-date and accurate. A sample frame was constructed from Brabys, Proudly South Africa, Eastern Cape Development Council (ECDC) and Small Enterprise Development Agency (SEDA) business directories. This frame was considered appropriate as it contained up-to-date mailing list of SMEs in the selected provinces and was sufficiently large to reduce sample bias.

3.4.3.3 Sampling Technique

Leedy and Ormrod (2005) observe that the majority of participants do not return questionnaires and those who do may not be representative of the original sample. Lucas (1991) argues that it is impractical to achieve randomness in a research in which participants can decide not to respond. He therefore proposes the selection of participants in such a manner that it does not differ from a random sample. Teddlie and Yu (2007) observe that sampling techniques are not discrete but form a continuum, spanning non-probabilistic and probabilistic, and can be combined to good effect. They present a typology of mixed method.

This research adopted a stratified purposive sampling technique, which combines both stratified and purposive procedures. The former is probabilistic and assures randomness, and the latter enables the researcher to select units that meet the research purpose (Teddlie & Yu, 2007). This technique is used in IS research, e.g. Seyal *et al.* (2000). The sample frame was divided into strata along sector and province, as shown in Table 3.4, and samples were selected based on purposive techniques.

3.4.3.4 Sample Size and Selection

The "tradition [in a] particular research area" determines the appropriate sample size (Hussey & Hussey, 1997: p. 149). Research in the area of SMEs is characterised by low response rate.

Bergeron, Raymond and Rivard (2004) contend that a typical response rate is between 10% and 15%. Leedy and Ormrod (2005) observe that in general a sample size of about 400 is adequate for a large population. Thus, a sample size of 600 was considered sufficiently large to ensure a representative sample. The composition of firms in the sample is shown in Table 3.4. Fifty firms were selected per industry per province.

Province	Industry			
	IT	Finance	Transport	Retail
Eastern	50	50	50	50
Western	50	50	50	50
Gauteng	50	50	50	50
Total	150	150	150	150

Table 3.4: Sample

3.4.4 Data Collection

An important issue in research is to know what information is needed to answer the research question and from what source it is to be collected (Ghauri & Grønhaug, 2002). The unit of analysis and the characteristics of interest have been identified above. Generating the appropriate data to answer a research problem requires an accurate and consistent instrument. Therefore, in constructing the research instrument, issues of validity and reliability were addressed.

Surveys typically employ questionnaire and interviews for data collection (Leedy & Ormrod, 2005; Oates, 2006). However, sample size, location, budget and the nature of information solicited may influence the data collection method (Ghauri & Grønhaug, 2002). This research required data from a sufficiently large sample on the sensitive issue of governance. A questionnaire was therefore considered an appropriate instrument for data collection. Compared to an interview, it provides an efficient means of collecting standardised data from a large group of respondents (Oates, 2006) and is less prone to socially desirable responses (De Leeuw, 1992). Constructing the questionnaire entailed operationalising concepts, pretesting and piloting, and reliability assessments (Cavana *et al.*, 2001; Lucas, 1991; Newsted *et al.*, 1998; Rea & Parker, 1997; Straub, 1989).

3.4.4.1 Identifying and Operationalising Variables

Measuring the characteristics of a research problem involves the translation or operationalisation of concepts into surrogate variables that are measureable (Straub, 1989). Oates (2006) and Straub (1989) recommend literature review as a precursor to instrument construction, as it assists the researcher to identify concepts relevant to the research and the kind of questions to be included in the instrument. The conceptual model in Figure 2.6 formed the basis of measurements.

The questionnaire consisted of two parts. *Section 1* was based on managerial, organisational and external factors identified from IT governance and IT in SMEs literature, and summarised in Tables 2.3 and 2.4. It captured the demographics of respondents and their respective firms, as shown in Table 3.5. Industry type and province (location) were identified and coded by the researcher to reduce the length of the questionnaire. All the variables have been operationally defined in extant research and were therefore adopted and, where appropriate, adapted.

Entity	Demographic Data	Item	Measurement
Respondent	Position in firm	1	Owner-manager, CEO, IT, Other
	Years in management position	2	0, 1, 2....., n
	Years in IT management	3	0, 1, 2....., n
	Gender	4	Male (1) or Female (2)
	Professional and educational background	5	IT, Business, Other,
Firm	Full time employees	6	0, 1, 2 ...., 200
	Years of in operation	7	0, 1, 2 ...., n
	Years of using computers (IT)	8	0, 1, 2 ...., n
	IT structure	9	Separate (centralised) or Not (Yes=1 or No=2)
	Industry	Captured by the researcher	IT, Finance, Transport, Retail (1, 2, 3, 4)
	Location		Western Cape, Eastern Cape, Gauteng (1, 2, 3)

Table 3.5: Measuring Demographics of Respondents and Firms

Section 2 measured IT governance practices and IT value. It was based on the conceptual definition of IT governance (adopted in section 2.2). The operational definitions in Tables 3.6 and 3.7 were adopted from extant literature, and revised where appropriate. All the items were measured on a five-point Likert scale of 1 to 5. Items 2A.5.1 and 2A.5.2 were specifically included to gather information on IT governance implementation tools.

IT governance and questionnaire design. The feedback was used to improve the content and structure of the instrument. The average time for completion was reduced to about twenty minutes.

3.4.4.4 Validity and Reliability Assessment

Oates (2006) and Straub (1989) propose content and construct validity, and reliability assessments of instruments. Validity is the extent to which an instrument measures the concepts or variables it is supposed to measure. On the other hand, reliability measures the extent to which an instrument consistently produces the same results, i.e., respondents can answer the questions the same way each time (Hair, Black, Babin, Anderson & Tatham 2006; Oates, 2006; Straub, 1989). These constructs, although different, are related somewhat: "we can measure something accurately only when we can also measure it consistently" (Leedy & Ormrod, 2005: pp. 93). An instrument cannot be valid if it is unreliable (i.e., if it gives different results on different occasions), nor reliable but invalid (i.e., if it gives inaccurate results consistently). Thus, this research endeavoured to attain both.

Content validity is the degree to which the questions in an instrument covers (i.e., is representative of) the domain under investigation (Leedy & Ormrod, 2005). This is generally assured through literature review, previous questions and panels of experts in the subject domain (Oates, 2006). As described above, literature review was conducted to delimit the domains of SMEs and IT governance, establish the variables of interest and to identify questions which have been used in relevant previous research. In addition, a panel of experts were used for pretesting and piloting.

Construct validity measures the extent to which the operationalised variables measure the constructs of interest (Boudreau, Gefen & Straub, 2001). It may be assessed in different ways, e.g., convergent and divergent validity (Ghauri & Grønhaug, 2002). Although there are various techniques, multi-trait multi method approach and factor analysis are widely used (Cavana *et al.*, 2001; Ghauri & Grønhaug, 2002; Straub, 1989). It is acknowledged that the former has inherent drawbacks (Agarwal & Prasad, 1998). Therefore, factor analysis was employed.

Reliability (also referred to as accuracy, consistency and stability) takes different forms in different situations. It is often assessed using interrater, test-retest, split halves and internal

The questionnaire items were designed to reduce both recall and socially desirable responses. In addition, responses were solicited from IT and other business managers, where applicable, for the purpose of corroboration. Method triangulation involves the use of two or more data collection methods, e.g., questionnaire and interview, to corroborate findings (Cavana *et al.*, 2001; Oates, 2006). Due to time constraints, interviews could not be conducted.

3.3.4.7 Improving Response Rate

A drawback of questionnaire as a data collection method is that the majority of the participants do not return responses (Leedy & Ormrod, 2005). A low response rate may reduce the representativeness of sample, and threaten validity (Armstrong & Overton, 1977). Various techniques have, therefore, been devised to improve response rate. These include a well-crafted letter of introduction and questionnaire, offer of incentives, identifying contact persons before distributing the questionnaire and follow-up contacts (Cooper & Yu, 1983).

A cover letter (on the University's letterhead for credence) introduced the purpose and benefits of the research, assured confidentiality and motivated the participants to respond (Cavana *et al.*, 2001; Rea & Parker, 1997). The questionnaire was designed to be short, attractive and easy to understand, and therefore, more likely to be completed. Contact persons and prospective respondents were identified, and a follow-up strategy implemented (section 3.3.4.8). As an incentive to respond, participants were offered the opportunity to request for a copy of the summary of research findings.

3.3.4.8 Questionnaire Administration

In general, questionnaires are administered by mail (postal and email), telephone and in-person. In-person and telephone yield higher response rates and more accurate data than mail but are expensive for research which covers a wide geographical expanse (Leedy & Ormrod, 2005; Oates, 2006; Rea & Parker, 1997). Email is less expensive, compared to postal mail. For this reasons, the questionnaire was mainly administered by email. However, this was supplemented with in-person in Cape Town, Pretoria and East London. Email was expected to be available in IT intensive firms and, as such, it did not preclude firms but reinforced the criterion for selecting the sample from the frame.

Prior to data collection, the participating firms were contacted by phone, email or in-person to explain the purpose of the research and to identify prospective respondents. Subsequently, a survey package consisting of a letter of introduction, consent form and questionnaire was distributed to the respondents by email or in-person. Each package was assigned a code and recorded against the name of the participating firm. The respondents were entreated to complete the consent form and questionnaire and return by email or fax. Where a package was delivered in-person, the researcher arranged for collection on an appointed date.

Participants who had not returned their responses were contacted after ten days by email, phone or in-person and reminded to do so. Fourteen days later, the researcher contacted the participants whose responses were outstanding, and in cases where the packages had been misplaced or lost, new ones were delivered. A last follow-up contact was made ten days later. All the questionnaires, except twelve of those distributed in-person, were self-administered. The researcher contacted the participant who returned completed questionnaires to express his gratitude.

3.4.5 Data Analysis Method

Deriving from its type and purpose, this research adopted quantitative methods for data analysis. This was preceded by data preparation which entailed data coding, inspection, entry and cleaning (Cavana *et al.*, 2001; Ghauri & Grønhaug, 2002; Rea & Parker, 1997). Questionnaire items were coded into numerical format to enable quantitative representation and statistical analysis of responses. Each questionnaire was inspected upon receipt for completeness and if usable, the responses were entered into a statistical package. To reduce data entry errors, a set of valid values was defined for each code. In addition, two individuals captured the same data independently in different statistical packages. The two data sets were compared and found to be similar (Ghauri & Grønhaug, 2002). Cleaning involved screening the data for anomalies (e.g., unusual values, gaps, etc.) using a statistical package and making the appropriate corrections.

Data analysis was conducted for the following purposes: to summarise and describe the data collected; assess the reliability of, and establish the relationship among, the variables under investigation; and to identify a structure or model describing IT governance practices in the participating firms.

3.4.5.1 Analysis of Individual Items and Variables

Descriptive statistics were used to summarise and describe the data collected. It involved the analysis of the characteristics of the participating firms and respondents, and responses to individual items and variables. Frequency distribution was used to represent the foregoing. In addition, descriptive information on the shape, central tendency and variability of the distributions of responses on the scale items were provided. Shape was measured by skewness and kurtosis, central tendency by average scores, and variability by range and standard deviation. For a normal distribution, the absolute values of skewness and kurtosis are approximately 0. The larger the absolute values, the further the deviation from normality.

Hair *et al.* (2006) draw attention to the inherent weaknesses in the use of single-item scales and conclude that a composite scale is more likely to measure a concept than its constituent items. They also recommend the use of summated scales composed of summed or average scores, preferably the latter as it facilitates further analysis. Reliability of the variables rather than the constituent items was assessed, using Cronbach's alpha. The average scores of the variables were subsequently used for further analyses: to determine the impact of managerial, organisational and external characteristics on IT governance practices and to explore bivariate relationships among the practices, and also among the practices and IT value.

3.4.5.2 The Structure of Responses to Variables

To identify a model describing IT governance in the participating firms, the items measuring IT governance practices and IT value were submitted to factor analysis. Factor analysis is a generic name for a collection of interdependent, multivariate methods used to identify the underlying structure of a data set (Ghauri & Grønhaug, 2002). It may be broadly classified into exploratory factor analysis and principal component analysis. Although similar in approach, the underlying mathematical models are different (DeCoster, 1998; Ghauri & Grønhaug, 2002; Segar, 1997). Exploratory factor analysis accounts for only common variance, and is appropriate for discovering an unknown underlying structure. On the other hand, principal factor analysis accounts for total variance (i.e., common and unique variance), and is often used to reduce a complex set of variables into a simpler subset based on an *a priori* structure. Both methods are widely used in IS research (Segars, 1997).

DeCoster (1998) recommends exploratory factor analysis if the research purpose is to identify factors responsible for a set of measured values and principal factor analysis if the purpose is only data reduction. A limitation of the former is that it produces an infinite set of possible solutions (Segars, 1997). However, unlike principal factor analysis, it does not require a large sample size. Notwithstanding the foregoing, some scholars conclude that there is no significant difference between these techniques (Costello & Osborne, 2005). In accordance with the research objective (i.e., to identify the factors which describe IT governance in SMEs) and the tradition of small sample size in SME research, exploratory factor analysis was considered appropriate.

In general, factor analysis consists of the following: establishing the factorability of items, extracting initial factors and rotating the factors to obtain a meaningful final solution (Costello & Osborne, 2005; DeCoster, 1998; Tredoux & Pretorius, 2004). Factorability analysis was conducted to establish if the data lent itself to factor analysis. There are many extraction techniques. Maximum likelihood and principal factor analysis are considered the most efficient (Costello & Osborne, 2005; Fabrigar, Wegener, MacCallum & Strahan, 1999). The former assumes normality, while the latter does not. Fabrigar *et al.* (1999) recommends maximum likelihood unless the data severely lacks normality (i.e. if the absolute value of skewness is greater than 2, and kurtosis is greater than 7).

The number of factors retained in factor analysis is a function of the researcher's judgement and the purpose of the research. Various heuristics for factor extraction have been proposed. For the purposes of this research, Kaiser criterion of eigenvalues greater than 1 and the scree test were used. The initial factor solution was rotated to achieve a more meaningful factor structure. The main rotation procedures are orthogonal, which assumes uncorrelated factors, and oblique, which assumes correlated factors (Costello & Osborne, 2005; Tredoux & Pretorious, 2004). It is common to use both procedures and to select the more meaningful structure. Both rotation methods were therefore explored. The selected factor solution was subsequently subjected to reliability analysis.

3.5 Research Ethics

Ghauri and Grønhaug (2002) and Oates (2006) present two dimensions of ethics in research, namely: researcher-participant relationship and the researcher's moral responsibility. The university requires researchers to comply with its research ethics guidelines. According to the guidelines, researchers are obliged to seek ethical clearance for research involving human subjects. An ethical clearance was obtained from the Ethics Committee before data collection commenced. The research package, which consisted of a cover letter, consent form and research instrument (Appendices A, B and C) and an ethics form outlining the ethical issues (Appendix D), were submitted for scrutiny and approval.

The fundamental ethical principles of autonomy, non-maleficence and beneficence guided the design and conduct of this research. These principles, in the order given, require the researcher to respect the autonomy of, not to cause harm to, and to design and conduct the research in the interest of, participants (Durrheim & Wassenaar 2004). Autonomy addresses issues such as the participants' voluntary consent, and the right to anonymity and to withdraw at any stage from the research (Oates, 2006).

Durrheim and Wassenaar (2004) and Oates (2006) provide guidelines on the research-participant relationship. A cover letter soliciting participation from firms explained the purpose and benefits of the research and the rights of participants. It also explained the efforts by the researcher to assure confidentiality and anonymity, and to prevent risks to participants and or their firms as a consequence of their participation. Lastly, it entreated participants with concerns to contact the researcher or supervisor, whose contact details were provided in the cover letter.

Ethics also concerns "...social guidelines and constraints upon research techniques and measurements" (Ghauri & Grønhaug, 2002). It enjoins the researcher to acknowledge participants' right to privacy, exercise integrity throughout the research process, adhere to professional code of ethics, and avoid plagiarism (Ghauri & Grønhaug, 2002; Leedy & Ormrod, 2005; Oates, 2006). The researcher designed the instrument to collect only data relevant to the research; proceeded to collect, record, analyse and interpret the data accurately; and complied with the faculty's ethics code, including plagiarism (see Plagiarism Declaration)

Summary of Chapter

Decision choices in research design involve trade-offs between philosophical assumptions, practical constraints and research objectives. This chapter provided an overview of the philosophical assumptions and the dominant IS research paradigms, set the strategic and operational framework within which this research was conducted, and outlined the efforts to assure validity and reliability of findings. Consistent with the purpose of the research (i.e., to gain insight into IT governance in SMEs) a positivist, descriptive and quantitative research was considered appropriate, and therefore, adopted for this research.

A research methodology which consisted of a survey strategy and quantitative data collection and analysis methods was implemented. A sample of 600 SMEs was drawn from the IT, finance, transport and retail industries from the Western Cape, Eastern Cape and Gauteng provinces. A questionnaire was constructed, pretested, piloted and administered to managers in the participating firms. The responses were prepared for statistical analysis, and the results are presented in the next chapter.

Chapter 4: Results

The purpose of this research, as indicated in Chapter 1, was to gain insight into IT governance practices in SMEs. To this end, research questions and propositions were formulated, and the research designed to collect data from top management on such practices on behalf of their firms. Statistical techniques were used to summarise and describe the data, assess the reliability of the measurement scales, establish the relationships among the variables of interest, and to identify a structure to describe IT governance in the participating firms. The preceding chapter described the data analysis techniques which were used.

This chapter presents the results of the data analysis and consists of the following sections: *4.1 Response Rate:* determines the response rate and compares with previous studies; *4.2 Limitations of Statistical Analysis* discusses the effect of sample size on data analysis and reliability of findings; *4.3 Characteristics of Firms and Respondents* provides a summary of the demographics of the participating firms and respondents; *4.4 Analysis of Responses* presents the distribution of scale items, and examines the relationships among the variables; and *4.5 Structure of Responses* identifies the underlying structure of the responses obtained from participants.

4.1 Response Rate

As discussed in section 3.4.3.3, the questionnaire was sent to 600 SMEs in the Western Cape, Eastern Cape and Gauteng provinces in South Africa, soliciting responses from top management. Fifty firms were selected from each of the following industries in each province: IT, finance, transport and retail. Where an IT manager existed as a separate role, the firm was asked to return two questionnaires: from the IT manager and another person in management position. As outlined in section 4.4.7, efforts were made to improve the response rate.

Eighty-four questionnaires were returned, 71 of which were usable; 67 firms participated, four of which returned two questionnaires each. Considering the small number of matched responses, the researcher decided to use one response per firm in the analysis. Sixty-seven responses were, therefore, used for data analysis, i.e., a response rate of 11.2 percent. This is typical of research involving SMEs (Bergeron *et al.*, 2004) or top management (Ghobadian & O'Regan, 2006).

O'Donohue *et al.* (2009) also reported a low response rate among SMEs in an IT governance study.

4.2 Limitations of Statistical Analysis

It has been established that a larger sample size conduce to accuracy of statistical analysis (Leedy & Ormrod, 2005; Rea & Park, 1999). Lucas (1991) contends that a sample size of 50 is acceptable for quantitative analysis. Ali and Green (2007) used statistical analysis in their study which involved 54 responses. Therefore, 67 in this research may be considered acceptable. It is, however, acknowledged that a larger sample size could have improved the accuracy of the results.

4.3 Characteristics of Firms and Respondents

Frequency distribution of participating firms and respondents, and analysis of non-response bias are presented below.

4.3.1 Demographics of Participating Firms

4.3.1.1 Industry and Province

Table 4.1 shows the distribution of firms by industry and province, and is illustrated in Figure 4.1. About one third belonged to the IT industry; the other industries each constituted about one-fifth. The firms were almost equally distributed among provinces.

		Province			
		WC	EC	GP	Total
Industry	IT	10 (14.9%)	7 (10.4%)	6 (9.0%)	23 (34.3%)
	Finance	3 (4.5%)	5 (7.5%)	6 (9.0%)	14 (20.9%)
	Transport	3 (4.5%)	6 (9.0%)	6 (9.0%)	15 (22.4%)
	Retail	7 (10.4%)	5 (7.5%)	3 (4.5%)	15 (22.4%)
	Total	23 (34.3%)	23 (34.3%)	21(31.3%)	67 (100%)

Table 4.1: Distribution of Firms by Industry and Province

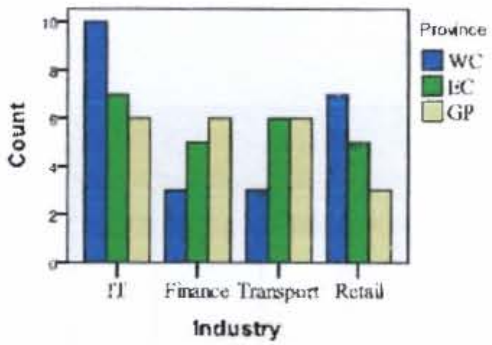

Figure 4.1: Distribution of Firms by Industry and Province

4.3.1.2 Size and Structure

Over three-fifths of the firms had less than 50 employees. Thus, mode and median (and not mean) were considered the appropriate measures of central tendency. The mode and median were 15 and 16 respectively. The firms were classified into four groups for analysis, according to size as defined by the NSBAA (2003). The distribution, shown in Table 4.2, follows a normal curve (Figure 4.2). Only 26 (38.8 percent) of the firms had separate IT units.

Classification	Size	Frequency	Percent
Micro (1)	<5	7	10.4
Very small (2)	>= 5 and <20	29	43.3
Small (3)	>=20 and <50	21	31.3
Medium (4)	>=50 and <200	10	14.9
	Total	67	100

Table 4.2: Distribution of Firm by Size

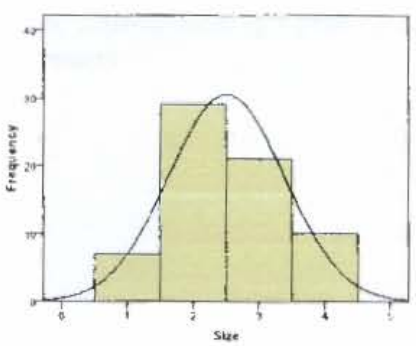

Figure 4.2: Distribution of Firm by Size

4.3.1.3 Age of Firm and Years Operating Computers

Table 4.3 and Figures 4.3a and 4.3b summarise the ages of firms and the number of years of using computers. On the average (mean and median) the firms were about 11 years old (standard deviation (SD) = 6.66) and had used computers for about 10 years (SD = 6.6). About half were over 10 years old. Also, about half had used computers for over 10 years. It may be concluded that the firms were mature, had acquired the necessary IT capabilities and established effective IT governance practices.

Years					Distribution	
	Mean	Median	SD	Category	Frequency	%
In Operation	11.25	11	6.66	<= 5	16	23.9
				6 - 10	17	25.4
				>10	34	50.7
Using Computers	10.99	10	6.60	<= 5	17	25.4
				6 - 10	18	26.9
				>10	32	47.9

Table 4.3: Distribution of Firms by Age and Years Using Computers

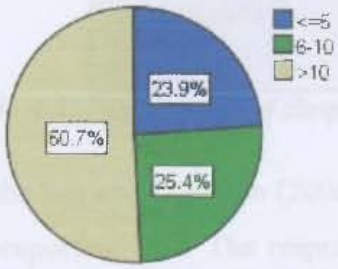

Figure 4.3a: Distribution of Firms by Age

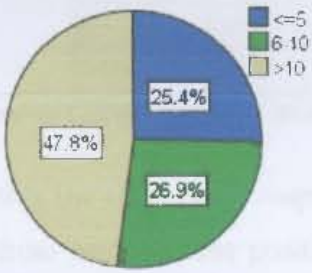

Figure 4.3b: Distribution of Firms by Years using computers

4.3.2 Demographics of Respondents

4.3.2.1 Position, Background and Gender

Table 4.4 shows the position, background and gender of respondents. About half were owner-managers, about half had business background and over two-thirds were males.

Characteristic		Frequency	%
Position	Owner-Manager	34	50.7
	CEO	7	10.4
	IT Manager	19	28.4
	Other	7	10.4
Background	Business	33	49.3
	IT	24	35.8
	Other	10	14.9
Gender	Male	46	68.7
	Female	21	31.3

Table 4.4: Distribution of Respondents by Position, Background and Gender

4.3.2.2 Experience in General and IT Management

Table 4.5 summarises the experience of respondents in general and IT management. About three-quarters and three-fifths had more than five years experience in general and IT management respectively.

	Years				Distribution	
	Mean	Median	SD	Category	Frequency	%
Management	8.7	8.0	5.4	<= 5	18	26.9
				6 - 10	27	40.3
				>10	22	32.8
IT Management	6.2	6.0	4.7	<= 5	29	43.3
				6 - 10	26	38.8
				>10	12	17.9

Table 4.5: Distribution of Respondents by Experience in General and IT management

Ghobadian and O'Regan (2006) contend that targeting the appropriate respondents could reduce self-reporting bias. The respondents were drawn from management positions; in addition, the averages (mean and median) and standard deviations (SD) showed considerable experience in both general and IT management. It may be concluded that the respondents constituted an appropriate data source.

4.3.3 Non-Response Bias

Non-response could affect the representativeness of a sample in a survey. Researchers are, therefore, adjured to consider non-response bias. Various techniques have been recommended for its estimation. A popular approach is to sample non-respondents (Armstrong & Overton, 1977; Leedy & Ormrod, 2005). Good and Hardin (2003) and Hussey and Hussey (1997) recommend a follow-up on non-respondents to gather data and to draw comparisons with respondents. Leedy and Ormrod (2005) propose contacting a small number of non-respondents. Twelve firms (one firm per industry, i.e., four per province) were contacted to gather demographic data and reasons for non-participation. Five stated that the research did not apply to their firms; three indicated lack of time; two attributed it to company policy, which prohibited participation in research conducted by external entities; and two did not respond to enquiries.

Table 4.6 compares the characteristics of respondents and non-respondent, using Mann-Whitney tests (discussed in section 4.4.3). The results show there were no significant difference between the two groups according to size, age and years of using computers. It may be concluded that both samples came from the same frame and that non-response did not introduce any significant sample bias. However, the small final sample may affect the external validity of findings.

	Years in Current Position	Yrs in IT Mgt	Employees	Age	Years Using computers
Mann-Whitney U	337.00	380.50	345.50	355.50	349.50
Z	-0.95	-0.32	-0.98	-0.69	-0.77
Asymp. Sig. (2-tailed)	0.34	0.75	0.33	0.49	0.44

Table 4.6: Comparing Respondent and Non-Respondent Firms

4.4 Analysis of Responses

Descriptive statistics were used to summarise and describe the responses to individual scale items and the variables for IT governance practices and IT value. Reliability and comparison of the variables were also conducted. The results are presented below.

4.4.1 Characteristics of Responses

Appendix E provides a summary of responses to the items measuring practices and IT value. Table 1.1 shows the frequency distribution of items and Table 1.2 shows the central tendency, variability and shape of the distributions. As evidenced by the sample size (N), there were no missing values. Less than half (46.3 percent) of the respondents agreed (i.e., agreed or strongly agreed) that their firms were familiar with the ECT Act; 41 (61.2 percent) agreed to implementing data policy; 26 (38.8 percent) agreed to familiarity with IT governance tools; and only 10 (14.9 percent) agreed to having implemented at least one such tool.

About two-fifth of respondent did not agree (i.e., strongly disagree, disagree or uncertain) to identifying goals to be achieved with IT, more than half did not agree to measuring IT benefits and more than half found it difficult (agreed or strongly agreed) to measure IT benefits. Most respondents (71.6 percent) indicated that IT improved (strongly or very strongly) the quality of service in their firms, and few (12.0 and 9.0 percent respectively) agreed to using external entities to identify IT benefits or risks.

A further analysis of the distributions revealed that of the 41 firms which had data policies, only 27 (i.e., 40.3 percent of participants) agreed to awareness of the ECT Act. It is possible that the firms which were unaware may have policies inconsistent with the Act. Eighteen of the 25 that indicated inadequate infrastructure (i.e., strongly disagreed, disagreed or undecided) also agreed to IT outsourcing; all the 20 that indicated inadequate expertise agreed to IT outsourcing; and only 23 of the 40 that agreed to outsourcing also agreed to having formal agreement with service providers. Twenty of the 35 that did not measure IT benefits regularly also agreed that it was difficult to measure.

As indicated in Table 1.2 (Appendix E), for a five-point scale only four items had means below average (i.e., 3). This suggests that, in general, respondents agreed with, or were ambivalent about, the opinions expressed by the items. The ranges and standard deviations also show that the responses were widely spread around the means, except the items measuring improvement in quality of service and IT investment decisions. The values for skewness and kurtosis indicate the responses were not normally distributed.

4.4.2 Reliability of the Instrument

Average scores were computed as surrogate measures of the IT governance practices and IT value and used for further analysis (section 4.4.3 and 4.4.4). Table 4.7 shows the reliability coefficients (α), means and standard deviations of the variables. The minimum value for α was 0.57. It may be concluded that, for an exploratory research, the instrument was reliable (see section 3.3.4.4). It may also be observed (from mean and standard deviation) that, on a five-point Likert scale, the firms rated average across all aspects of IT governance.

Variable	No. of Items	α	Mean	SD
IT and Business Alignment	4	0.82	3.57	1.04
IT Resource Management	5	0.61	3.54	0.73
IT Risk Management	5	0.84	3.39	0.95
IT Performance Management	8	0.80	3.04	0.74
IT Value	5	0.57	3.49	0.60

Table 4.7: Descriptive Statistics (IT Governance Practices and IT Value)

4.4.3 Comparing Responses

In addition to the small sample size, the responses were not normally distributed (as shown by the skewness and kurtosis). Non-parametric statistics were therefore applied to further analyse the responses. Unlike parametric statistics, non-parametric make no assumptions about normality, are effective for small samples, and may be used for nominal and ordinal scales (Cavana *et al*, 2001; Leedy & Ormrod, 2005; Rea & Parker, 1997). Average scores of variables (section 4.4.2) were used to compare responses to establish whether or not there were significant differences in practices according to the characteristics of firms and respondents.

Two main non-parametric statistics were used: Kruskal-Wallis and Mann-Whitney tests. The former is appropriate for examining the differences between more than two categories while the latter is used for two categories (Cavana *et al.*, 2001; Leedy & Ormrod, 2005). According to Cavana *et al.* (2001), significance levels (p) of 0.01, 0.05 and 0.1 (i.e., 1, 5 and 10 percent) are frequently used in business research. Due to the exploratory nature of this research, the differences were analysed at p=0.1 and 95 percent confidence interval.

Table 4.8 shows the results of the Kruskal-Wallis tests. The highlighted cells indicate the practices which differed significantly at $p<0.1$ at the respective Chi-Square (χ^2) and degrees of freedom (df) values. For example, it may be observed that there were significant differences across all practices according to firm size. On the other hand, the differences according to age of firm were non-significant across all practices. The results of the Mann-Whitney tests in Table 4.9 show that there were differences between firms with and without separate IT departments across all practices.

Similar tests were also conducted for respondents. Table 4.10 shows the results of the Kruskal-Wallis tests. The highlighted cells show there were significance differences in responses, according to management position and background. However, there were no differences due to years in management or years in IT management position. The Mann-Whitney tests (Table 4.11) also show that there were no significant differences among respondents according to gender.

	Size (df=5)		Age (df=2)		Using Computer (df=2)		Province (df=2)		Industry (df=3)	
	χ^2	Sig	χ^2	Sig	χ^2	Sig	χ^2	Sig	χ^2	Sig
Strategic Alignment	10.37	0.02	0.89	0.64	1.45	0.49	3.53	0.17	11.45	0.01
IT Resource Mgt	7.67	0.05	0.75	0.69	1.33	0.51	5.77	0.06	2.36	0.50
IT Risk Mgt	13.27	0.00	0.26	0.88	0.09	0.96	2.53	0.28	7.13	0.07
IT Performance Mgt	10.15	0.02	2.83	0.24	2.58	0.28	4.07	0.13	9.62	0.02
df=Degrees of Freedom, χ^2=Chi-Square, Sig = Asymptotic Significance										

Table 4.8: Differences in Practices by Province, Industry and Firm Size, Age and Years of Using Computers

	Alignment	Resource Mgt	Risk Mgt	Performance Mgt
Mann-Whitney U	236.00	325.50	226.50	255.00
Z	-3.83	-2.68	-3.96	-3.58
Asymp. Sig. (2-tailed)	0.00	0.01	0.00	0.00

Table 4.9: Differences Among Firms by IT Structure

	Position (df=3)		Background (df=3)		Yrs in Current Position (df=2)		Yrs in IT Mgt (df=2)	
	χ^2	Sig.	χ^2	Sig	χ^2	Sig	χ^2	Sig
Strategic Alignment	19.09	0.00	8.86	0.01	0.41	0.81	2.30	0.32
IT Resource Mgt	13.99	0.00	3.13	0.21	1.53	0.47	1.20	0.55
IT Risk Mgt	14.51	0.00	11.56	0.00	0.89	0.64	4.22	0.12
IT Performance Mgt	21.32	0.00	5.53	0.06	1.90	0.39	0.82	0.66
IT Value	6.74	0.09	5.12	0.08	1.07	0.59	0.10	0.95
df=Degrees of Freedom, χ^2=Chi-Square; Sig = Asymptotic Significance								

Table 4.10: Differences Among Respondents by Position, Background and Experience

	Alignment	Resource Mgt	Risk Mgt	Performance Mgt
Mann-Whitney U	446.00	399.50	370.50	448.00
Z	-0.50	-1.14	-1.53	-0.47
Asymp. Sig. (2-tailed)	0.62	0.26	0.13	0.64

Table 4.11: Differences between Respondents by Gender

4.4.4 Relationship between Variables

As stated in the literature review, there is a strong correlation between IT governance and improved IT value (ITGI, 2009; Weill & Ross, 2004). Other studies have also established relationships between individual practices and IT value, e.g., strategic alignment and improved

analysis is exploratory; in addition, the sample size was small. Thus the cut-off point was set at 0.5 (Castello & Orsborne, 2005; Field, 2000). Solutions with three, four, five and six factors were explored using both orthogonal (Varimax) and oblique (Direct Oblimin) rotation. In each case, items with loadings less than 0.4 were excluded in the early stages and the maximum likelihood procedure was repeated at 0.5. The oblique rotations did not produce interpretable solutions and were therefore discarded. Tables 1.1 to 1.6 (Appendix F) show the initial six factor unrotated matrix and the three, four, five and six factor solutions from the orthogonal rotation. It may be observed that the five factor solution produced four factors. In addition, each solution had at least one factor defined by two items.

A factor with fewer than three items is considered unstable, and could be improved with a larger sample size or by revising and adding new items to the instrument (Castello & Osborne, 2005; Hatcher, 2003). On the other hand, such a factor may be maintained if it is aptly defined by the constituent items (Hatcher, 2003). The factors defined by two items were retained for two reasons: due to time constraints, it was impractical to increase the sample size or revise the questionnaire; second, the items described the factors.

The results of the goodness-of-fit tests in Table 4.15 show that the three and four factor solutions best fitted the data, while the five factor solution was the least optimal. Both over-factoring and under-factoring have drawbacks. However, Fabrigar *et al.* (1999) contend that over-factoring is likely to results in well-estimated factors, and should be preferred to under-factoring. The six factor solution (Table 1.6; Appendix F) was therefore selected as the meaningful structure representing the responses. Six items loaded less than 0.5 and were removed. Thus, 21 items were retained. It may be observed that there were no cross-loadings.

	Goodness-of-fit Test		
Factors	Chi-Square	df	Sig
3	193.70	133	0.00
4	213.60	149	0.00
5	62.37	61	0.43
6	118.88	99	0.09

Table 4.15: Goodness-of-fit Test

The factors solution is summarised in Table 4.16. As shown in Table 4.17, the six factors accounted for 75 percent of the total variance. It must be noted, however, that exploratory factor

analysis yields an infinite set of possible solutions and, as such, this is not assumed to be the only correct solution. In addition, a larger sample size could have improved the solution.

Factor 1		Factor 2		Factor 3	
Measuring Benefits	0.76	Business strategy	0.71	Risk by ext body	0.93
Reporting Procedures	0.74	IT strategy	0.69	Benefit by ext body	0.78
Identifying Risk	0.74	Understanding	0.68		
Identifying IT goals	0.73	Total Resources	0.57		
Data Policy	0.67	ECT Act	0.55		
Expertise	0.58	Infrastructure	0.51		
Investments	0.55				
Factor 4		Factor 5		Factor 6	
Communication	0.76	Security	0.97	Investment Evaluation	0.89
Training	0.66	Compliance	0.56	Attending Meeting	0.59

Table 4.16: Final Solution

	Initial Eigenvalues		
Factor	Total	% of Variance	Cumulative %
1	9.12	43.43	43.43
2	1.98	9.44	52.86
3	1.53	7.30	60.16
4	1.48	7.06	67.22
5	0.96	4.55	71.78
6	0.86	4.10	75.88

Table 4.17: Total Variance Accounted for by the Six Factors

4.5.4 Reliability of Factors

Reliability of the variables was assessed using Cronbach's alpha (α). A summary of the results is presented in Table 4.18. All the measures of reliability exceeded 0.6. It may be concluded that the factors were internally consistent. However, the accuracy of the results may be affected by the small sample size.

Factor	Items	Mean	SD	α
1	7	3.49	0.87	0.90
2	6	3.56	1.00	0.89
3	2	2.01	1.06	0.90
4	2	3.70	3.70	0.77
5	2	3.16	0.97	0.73
6	2	3.18	1.26	0.86

Table 4.18: Reliability Assessment of Factors

4.5.5 Naming the Factors

Although there are no established rules for naming factors, it is recommended that names must be meaningful and descriptive of the high-loading items of, and the dimension represented by, a factor (Halli & Rao, 1992). Among other things, they recommend the following to be discussed: items in a factor (usually the three highest loading items), consistency with conceptual definition, and aspects of the solution to be improved. Table 4.18 shows the mean, standard deviations and reliability measurements of the factors. The following describes the constituent items in, and suggest names for, the factors.

Factor 1: This constitutes the most important factor in IT governance to the participating firms. Identifying the benefits or goals to be achieved with IT and measuring IT benefits are from the IT Performance Management. Identifying and managing risks, mechanism for reporting risks and implementing data policy originate from the IT Risk Management dimension. These items relate to *IT Benefits and Risk Management* and loaded strongly (>=0.67). As reported in the literature, IT benefits and risk management is a prerequisite for IT value delivery. It may be concluded that the firms acknowledge the importance of these items. Although adequate expertise (from IT Resource Management) and improving IT investment decision (from IT value) are related to the above-mentioned concept, these items loaded less than 0.6 and may be considered not as important to the firms as the first five items in the factor.

The average score of 3.49 (SD =0.87) on a five-point scale suggests that respondents were ambivalent about this factor. Notwithstanding the high internal consistency (α =0.90), the factor did not exhibit content validity. Thus, future research should endeavour to move the last two items into a different factor. This may be achieved by adding new items to the questionnaire. (Cavana *et al.*, 2001).

Factor 2: This factor represents *IT and business alignment* and constitutes the second most important issue to the firms. The first three items which loaded on this factor belong to the Strategic Alignment dimension. As reported in the literature, strategic alignment is a *sin qua non* for achieving value from IT investment. These items loaded strongly (>=0.68) on the factor. According to Table 1.1 (Appendix E), about three-fifths of the respondents scored above average (i.e., 3 on a five-point scale) on the items in the Strategic Alignment dimension, except

management attending IT committee meetings. Chan and Reich (2007) note that SMEs are well-aligned because of their small size. Cragg *et al.* (2002) and ITGI (2009) also reported high occurrence of alignment. Inventory of IT resources and adequate infrastructure belong to IT Resource Management, while familiarity with the ECT Act (IT regulation) belongs to IT Risk Management. Although these items are essential to IT strategic alignment, they loaded less than 0.6 and may be considered not as important as the first three items.

The score of 3.56 (SD=1.0) shows respondents were undecided in their opinions about this factor. The high internal consistency (α =0.89) suggest construct validity among items, although the factor does not display content validity. Future research should seek to separate the last three items from those in the Strategic Alignment dimension. This may be achieved by adding new items to the questionnaire.

Factor 3: Using external entities to evaluate IT benefits and risks are from the IT Performance Management dimension and are concerned with *external oversight* of IT governance. The literature emphasises the need for independent oversight. Considering the lack of expertise, it was anticipated that SMEs would employ the services of external agencies to address the issue of oversight. However, the average score of 2.01 (SD=1.06) indicates the firms occasionally used this service. It was also found in Section 4.4.1 that few firms agreed to using external entities to identify IT benefits (12.0 percent) or risks (9.0 percent).

These are consistent with the literature. SMEs are unwilling to engage the services of external agencies, despite the lack of expertise and physical resources (Burgess, 2002; Ihlström *et al.*, 2003). This may be attributable to factors including lack of resources and awareness (Ihlström, 2003). The high construct validity (α =0.90) indicates internal consistency. However, the small number of constituent items shows the factor is unstable, and could be improved by adding new items to the questionnaire.

Factor 4: communicating IT benefits to employees is from IT Performance Management; IT training to employees is from IT Resource Management. These factors enable *continuous improvement* (Gregor *et al.*, 2004; ITGI, 2003; ITGI, 2005). Communicating the benefits of IT provides feedback on the extent to which IT has achieved its goal, and allows a firm to take corrective actions. This results in organisational learning. Training and learning results in

effective processes and, therefore, improved IT value. Rockhart *et. al*, (1996), state that monitoring and education facilitate strategic alignment.

The average score of 3.70 (SD=0.98) indicates the firms undertook these processes most of the time. This may be attributable to the small size and simple organisational structure, which promote informal communication and learning (Burgess, 2002; Dalley & Hamilton, 2000). The high construct validity ($\alpha = 0.77$) indicates internal consistency. However, the small number of constituent items shows the factor is unstable and could be improved by adding new items to the questionnaire.

Factor 5: consists of items from the IT Value dimension. As discussed in Chapter 1, improving IT security breaches and compliance with regulation have become imperative with the advent of the information economy. These items suggest the *perceived IT value* was improvement in the management of IT risks. Three of the highest loading items on Factor 1 are concerned with risk. As discussed in section 2.1.2, firms direct their governance effort towards achieving a business value. ITGI (2006) concluded that most firms implemented IT governance to achieve compliance. It may be argued that the participating firms directed their IT governance effort towards reducing risks.

The average score of 3.16 (SD=0.97) indicates the respondents were ambivalent in their opinions about the extent to which IT had contributed to business performance. This may be attributable to the lack of expertise in identifying the potential benefits of IT and measuring those benefits (Burgess, 2002). This is borne out by the data from this research (section 4.4.1). About two-fifths of respondents did not agree to identifying goals to be achieved with IT, and about half did not measure or found it difficult to measure IT benefits. While the high construct validity ($\alpha = 0.77$) suggests internal consistency, the small number of constituent items indicates the factor is unstable and could be improved by adding new items to the questionnaire.

Factor 6: the evaluation and approval of IT investments belongs to IT Performance Management and top management representation at IT committee meetings belongs to Strategic Alignment. The existence of an IT Committee indicates a *decision structure* for IT decision-making. On the other hand, management representation on the committee shows support for such a structure. The importance of decision structures and management support has been widely reported in the

literature (De Haes & Van Grembergen, 2008; Guldentops, 2004). Huang *et al.* (2009) also found these items facilitated IT governance in SMEs.

The average score of 3.18 (SD=1.26) suggests the firms only undertook these processes sometimes. This may be attributable to the prevalence of informal structures and centralised decision-making in SMEs, which may substitute for or complement formal IT decision structures. The high construct validity ($\alpha = 0.86$) indicates internal consistency among the items. However, the small number of constituent items indicates the factor is unstable, and could be improved by adding new items to the questionnaire.

From the foregoing, it may be concluded that all the factors exhibited construct, but not content, validity. This may be attributed to small sample size or unrepresentative questionnaire items or both (Castello & Osborne, 2005; Hatcher, 2003). However, the solution describes the firms' perception of IT governance, and therefore could form the basis for future research. Factor 1 and Factor 2 did not describe single themes, and the remaining factors consisted of a small number of items. In general, it was difficult to describe and assign names. The researcher concludes that it may be too early in the exploratory research to name factors (Pett, Lackey & Sullivan, 2003).

Summary of Chapter

This chapter presented the results of data analysis. The sample size was 67 and the response rate was 11.2 percent. There were no significant differences between the participating and non-participating firms, evidence that the respondents were representative of the sample frame, and therefore the population. In addition, the respondents had the requisite management experience, and constituted an appropriate data source. However, the small sample size may limit the reliability of the statistical analysis.

Analysis showed the instrument was reliable, the firms did not have effective IT governance practices, and there were significant differences in responses according to the position and background of a manager, firm size, type of IT structure, location, and industry type. The underlying structure of IT governance contained six factors. A goodness-of-fit measure indicated the structure fitted the data. Reliability analysis showed the factors were internally consistent, although they did not exhibit content validity. The next chapter presents an interpretation of the results, and conclusions and implications thereof.

Chapter 5: Discussion and Conclusion

The preceding chapters have defined the research problem, purpose and questions; described the research design and implementation; and presented the results of data analysis. The next stage in the research process is to establish the extent to which the results answer the research question, achieve the purpose and solve the problem under investigation. According to Leedy and Ormrod (2005), the ultimate aim of descriptive research is to solve problems through interpretation of empirical data.

This chapter advances reasons to support and or explain the findings, and discusses the contribution and implications of this research. It consists of the following sections: *5.1 Discussion* interprets the results in relation to the research objectives and extant literature; *5.2 Summary of Findings and Recommendations* makes recommendations for improving IT governance, based on the findings; *5.3 Contribution* discusses the contribution of this research to the field of IT governance; *5.4 Conclusion* draws conclusions from the findings; *5.5 Limitations* outlines the weaknesses in the research and their effect on the findings; and *5.6 Future Research* proposes areas for further investigation.

5.1 Discussion

The primary purpose of this research was to gain insight into IT governance practices in SMEs. The main objectives were to describe these practices, identify the factors of influence, and to prescribe a model for effective IT governance in SMEs. Based on the definition adopted for the purposes of this research, and consistent with ITGI (2003) and Webb *et al.* (2006), five variables (i.e., Strategic Alignment, IT Resource Management, IT Risk Management, IT Performance Management and IT Value) were identified and operationalised. The following relates the results presented in Chapter 4 to the research objectives, and extant literature.

5.1.1 Research Objective 1: Description of IT Governance Practices in SMEs

The general findings, as presented in sections 4.4.1 and summarised in Tables 1.1 and 1.2 (Appendix E), address the above-stated objective. Most of the firms were unaware of, or ambivalent about, the ECT Act and had not implemented data policies consistent with the Act,

although its ambit includes assistance to SMEs (provision of electronic communication centres, website portals, etc.) and regulation of data storage, processing and transmission procedures. In addition, most of the firms were not familiar with, and had not implemented, IT governance tools; did not identify goals to be achieved with IT or measure IT benefits; found it difficult to measure IT benefits; and did not use external support to identify benefits and risks. It may be concluded that the firms did not have effective IT governance practices.

These findings are consistent with previous research findings. Harindranath *et al.* (2008) found the lack of awareness of legislation which seek to promote the sector. Kyobe (2009) and Sewry and Upfold (2005) found the lack of compliance with IT regulation. These may be attributed to the lack of expertise and the high cost of compliance (Lighthelm & Cant, 2002). ITGI (2009) found that most firms have not implemented IT governance tools. This may be ascribed to the lack of expertise and the cost of implementation of such tools. Burgess (2002) and Irani, Standing, Lin and Burn (2005) attribute the barriers to identification and evaluation of benefits to the lack of resources and time. Burgess (2002) and Ihlström *et al.* (2003) claim that SMEs have a propensity for not using external expertise, due to cost and lack of information, among others.

5.1.2 Research Objective 2: Factors which Influence IT Governance Practices

The literature emphasised the need for research on SME and IT governance to investigate managerial, organisational and external factors. It was also established that IT governance practices influenced IT value. These were illustrated by the conceptual model in Figure 2.6. In pursuit of the above-stated objective, research questions and propositions were formulated. The following present the findings in conjunction with the research questions and propositions.

5.1.2.1 Research Question 1: What are the factors which influence IT governance practices in SMEs?

The factors in Table 5.1 were investigated and the findings presented in section 4.4.3 and 4.4.4.

Factors	Aspect of firm
Position, experience (professional background and experience in general and IT management), and gender	Managerial
Firm size, age, experience in using IT (computers), IT structure	Organisational
Province, Industry type,	External

Table 5.1: Factors under Investigation

Proposition 1: Managerial characteristics are likely to influence IT governance practices

The results of the Kruskal-Wallis and Whitney-Mann tests, summarised in Tables 4.10 and 4.11, address the above proposition and are discussed below.

Proposition 1A: Management position is likely to influence IT governance practices

There were significant differences across all practices according to management position (Figures 1.2a to 1.2d, Appendix G). This may be interpreted as differences in the managers' perception of *how* to achieve IT value. According to Table 1.1 (Appendix E), over two-fifths of the respondents indicated (i.e., strongly disagreed, disagreed or uncertain) that IT and business managers did not understand how IT could to be used to achieve business goals.

IT can create value at different parts of the firm (Kauffmann & Weill, 1989). Thus, the strategy and underlying practices to achieve value may differ from one part to another (Tallon & Kraemer, 2003). For example, IT and business managers may emphasise different IT governance practices. In addition, managers at higher organisational levels are likely to be more knowledgeable about firm-level issues but lack understanding of how IT may be used at an operational level to improve business performance (Huang *et al.*, 2009). Thus, "different levels of management perceive IT value differently [sic]" (ITGI, 2003, pp. 25). These may explain the differences in perception. It may be concluded that management position influenced IT governance practices.

Proposition 1B: Professional background is likely to influence IT governance practices

The literature review (section 2.3.3.1) established that management shapes the culture and practices in SMEs and their expertise in IT affects IT value. Consequently, differences were anticipated across all the IT governance practices. There were significant differences across all practices, except IT Resource Management. It may be concluded that the background of a manager influenced these practices. Further analyses (Figures 2.2a to 2.2c, Appendix G) showed there were significant differences between managers with IT and business backgrounds, on the one hand, and other managers on the other. The differences between managers with IT and business backgrounds were non-significant. It appears the managers with IT and business background possessed the requisite experience which results in improved IT practices.

Proposition 1C: Number of years in management position is likely to influence IT governance practices

There were no significant differences due to years in management. It appears mere tenure in management position did not influence IT governance practices. This is contrary to the expectation that tenure could provide a manager with experience in governance in general, and IT governance in particular. This may be attributed to the distribution of respondents. As shown in Table 4.5, three-quarters had more than five years experience in general management. It appears the managerial experience of respondents did not have a significant impact on the IT governance practices in their firms.

Proposition 1D: Number of years in IT management position is likely to influence IT governance practices

There were no significant differences due to years in IT management. It appears mere tenure in IT management position did not influence IT governance practices. This is also contrary to the expectation that tenure could provide a manager with experience in IT decision-making, which may lead to improved practices. This may be attributed to the distribution of respondents. According to Table 4.5, about three-fifths of the participants had more than five years experience in IT management. It may be that the respondents had acquired the necessary skills in IT governance.

Proposition 1E: The gender of a manager is likely to influence IT governance practices

There were no significant differences according to gender. It appears the gender of a manager did not influence IT governance practices. This is contrary to the expectation that gender influences IT-related decision-making by managers, and therefore, IT governance practices. This may be attributable to the distribution of respondents: two-thirds were males.

Proposition 2: Organisational characteristics of a firm is likely to influence IT governance practices

The results of the Kruskal-Wallis and Whitney-Mann tests (Tables 4.8 and 4.9) address the proposition above, and are discussed below.

Proposition 2A: Firm size is likely to influence IT governance practice

There were significant differences across all practices, as anticipated. Further analyses (Figures 3.2c and 3.2d, Appendix G) showed significant differences in IT Risk Management and IT Performance Management between the medium and the micro and very small firms. It may be concluded that the size of firm influenced these practices: the larger SMEs performed these practices effectively than the smaller. This may be explained by the disparity in resources: larger SMEs may have the resource to allocate to these practices. The patterns in Strategic Alignment and IT Resource Management were not interpretable. As shown in Figure 3.2a and 3.2b, there were no significant differences in these practices according to firm size, except between firms with five to 20 and 50 to 200 employees.

Proposition 2B: The age of a firm is likely to influence IT governance practices

There were no significant differences according to age. It appears the mere passage of time did not affect IT governance practices. This is contrary to the expectation that the age of a firm is associated with its IT expertise and practices, i.e., the older the firm the more established its IT capabilities (Prasad, Heales & Green, 2009). This may be attributable to the distribution of firms. According to Table 4.3, the average age of the firms was about 11 years (SD=6.66) and over three-quarters were over five years old. It may be concluded that age did not influence the IT governance practices in the firms.

Proposition 2C: Years of using computers is likely to influence IT governance practices

There were no significant differences. It appears the years a firm has used IT did not affect IT governance practices. This is contrary to the expectation that firms which had used IT for a long time would have built the requisite expertise and implemented effective practices (Prasad *et al.*, 2009). This may be attributable to the distribution of firms. According to Table 4.3, the firms had used computers for over 10 years on average. Also, over three-quarters had used computers for over five years. It may be concluded that although the firms had acquired experience in using computers, this had not resulted in improved IT governance practices.

Proposition 2D: IT structure is likely to influences IT governance practices

There were significant differences across all practices. According to Table 4.1 (Appendix G), the firms with separate IT department performed better across all practices than those without. It may be concluded that IT structure affected practices. Haung *et al.* (2008) argue that separate IT

structure could facilitate IT governance in SMEs. This may be explained by the designated roles for IT, which promotes relationships with other business managers (Ward & Peppard, 2005). A further analysis using Kendall-Tau test (Table 5.2) showed a negative, average correlation between IT structure and firm size. This means the larger SMEs were linked with separate IT department (i.e., Yes=1) and the small SMEs, the opposite (i.e., No=2). Ein-Dor and Segev (1982), however, found no correlation between the number of employees and IT structure.

	Size	IT dept
Size	1.00	-0.55**
IT dept	-0.55**	1.00
**. Correlation is significant at the 0.01 level		

Table 5.2: Correlation between IT Structure and Firm Size

Proposition 3: External characteristics of a firm are likely to influence IT governance practices

The results of the Kruskal-Wallis test (Tables 4.8) address the proposition above, and are discussed below.

Proposition 3A: The location of a firm is likely to influence IT governance practices

There were significant differences in only IT Resource Management. It may be concluded that the location of a firm influenced this practice. The firms in Gauteng (which has the highest concentration of IT infrastructure and expertise) had the highest mean rank, i.e., excelled in IT Resource Management. Further analysis (Figure 5.2, Appendix G) showed that firms in the Eastern Cape (which is the least endowed with IT resources) outperformed the Western Cape in IT Resource Management. According to Table 5.3, about two-thirds of the participants from the Eastern Cape indicated (i.e., agreed or strongly agreed) that their firms used IT outsourcing. It appears the firms used IT outsourcing to address the lack of IT infrastructure and expertise.

Response	Province		
	WC	EC	GP
Strongly Disagree	9	0	1
Disagree	2	4	6
Undecided	0	4	1
Agree	9	13	11
Strongly Agree	3	2	2
Total	23	23	21

Table 5.3: IT Outsourcing by Province

Proposition 3B: The industry type is likely to influence IT governance practices

Different industries have different business operations and IT intensity, which influence IT practices (section 2.3.3.3). Thus, differences in practices according to industry were anticipated. There were significant differences in all practices, except IT Resource Management. It may be concluded that the type of industry influenced these practices. However, it appears the sampled sectors had the appropriate infrastructure and managerial and technical capabilities. Further analyses (Figures 6.2a to 6.2c, Appendix G) showed that the differences in IT Risk Management were non-significant. Conversely, there were significant differences in Strategic Alignment between IT and the retail industries and in IT Performance Management between finance and retail. That is, the retail industry performed poorly in both practices. This was expected: SMEs in the retail sector use IT as an operational, but not a strategic, tool.

5.1.2.2 Research Question 2: What is the impact of IT governance practices on IT value?

Proposition 4: There is a link between IT governance practices and IT value

Proposition 4A: There is a link between Strategic Alignment and IT value

Proposition 4B: There is a link between IT Risk Management and IT value

Proposition 4C: There is a link between IT Resource Management and IT value

Proposition 4D: There is a link between IT Performance Management and IT value

The results in Table 4.12 apply to propositions 4A to 4D. It may be observed that the relationships were significant. This is consistent with the finding by ITGI (2006). Although it may be impossible to draw causal relationship, it can be speculated that improving a practice may result in an improvement in the other practices, and consequently, in IT value. The opposite may also be true. As reported in the literature, the relationship between IT governance practices and IT value may be circular, i.e., improvement in practices may result in improvement in IT value and *vice versa*. It may be concluded that the IT governance practices influenced IT value.

Proposition 5: There is no difference between responses from the same firm

This could not be established. Only four paired responses were received, and the researcher decided not to proceed with analysis.

5.1.3 Research Objective 3: Assisting SMEs to Improve IT Governance

The third research question: "How could SMEs improve IT governance?" relates to the above objective, and could be addressed by answering the ancillary question: "what are the factors which enable IT governance in SMEs?" The factor solution in Table 4.16 encapsulated the perceptions of IT governance in the participating firms. The factors, described in Table 5.4, have been identified as enablers of IT governance in previous research and existing literature. The following discuss their contribution to improving IT governance in SMEs.

Factor	General Description	Source
1	IT benefit and risk management	ITGI (2006)
2	IT and business alignment	Guldentops (2004)
3	External oversight	ITGI (2009); O'Donohue *et al.* (2009)
4	Organisational learning	Gregor *et al.* (2008); ITGI (2003)
5	Perceived IT value	ITGI (2009); ITGI (2003)
6	Decision structure	Huang *et al.* (2009), Guldentops (2004)

Table 5.4: Enablers of IT Governance

The overarching objective of IT governance is to reduce risk and improve IT value. ITGI (2006) concludes that defining a *benefits and risk management* system and setting achievable expectations (i.e., *perceived value*) could contribute to an effective IT governance. *IT and business alignment* has been identified as the cornerstone of IT governance and determinant of IT value (ITGI, 2003). Guldentops (2004) states that IT and business alignment improves strategy setting and ensures delivery against the strategy. IT *decision structure* supports IT and business alignment (Guldentops, 2004; ITGI, 2006). Huang *et al.* (2009) conclude that IT decision structure facilitates management involvement, induces appropriate behaviour and promotes relationships among people and organisational units. Ali and Green (2005) found that the existence of such a structure positively influenced the effectiveness of IT governance.

Sleig (2008) contends that IT governance is a journey towards IT effectiveness and integration within business. *Continuous improvement* is therefore essential. The outcome of IT use engenders organisational learning and new ways of doing things, which feed back into changes in practices and application of IT (Gregor *et al.*, 2008). *External oversight* may provide the assurance that IT governance is achieving its objectives (Calder, 2005; Jordan & Silcock, 2005). In addition, the external agency may be used to address the lack of expertise in IT governance by

educating management and providing independent advice on practices (ITGI, 2009; O'Donohue *et al.*, 2009).

5.2 Summary of Findings and Recommendations

Finding: In general, the firms did not have effective IT governance practices. Most of the firms were unfamiliar with, or ambivalent about, the ECT Act and IT governance tools; did not implement the latter; and did not, or found it difficult to, identify and measure the potential benefits of IT.

Recommendation: *There is a need to create awareness and build expertise in compliance in particular and IT governance in general.* Government agencies could assist by providing awareness programs on the benefits of the ECT Act (and other such policies which seek to promote the SME sector) and training on compliance. Such agencies may also be used to address the lack of expertise in IT governance and as independent oversight bodies to improve practices (O'Dohonue *et al.*, 2009).

Finding: The position and background of a manager influenced Strategic Alignment, IT Risk Management and IT Performance Management. However, tenure in general or IT management, or gender of a manager did not influence practices.

Recommendation: Involve managers in the organisation in IT governance. Individuals within firms contribute different levels of expertise. Management gains experience through ongoing involvement in IT governance (Weill & Ross, 2004). Involving managers from different levels of the firm could improve IT governance practices. Huang *et al.* (2009) apply a network perspective to explain the benefits of top management involvement. These include appropriate behaviour, improved relationship and cumulated expertise. Top management involvement in IT governance structure may enable shared expectations and appropriate behaviour, serve as a social mechanism to control employees and facilitate relationships. The result may be consistency in organisational practices and IT value. In addition, the expertise of operational managers could be harnessed to align IT and business strategies. In SMEs where formal structures do not exist, the involvement of management may only facilitate relationships. Thus, a structure of authority may be necessary to govern IT.

Finding: The size of firm and type of IT structure influenced IT governance practices. The larger SMEs performed better than the micro and very small firms in IT Risk Management and IT Performance Management. The age and number of years of using IT had no influence on practices. The firms with separate IT departments were more likely to excel in these practices than firms without. In addition, the larger firms were more likely to have a separate IT department. Although the direction of association is inconclusive, it is possible to speculate that the larger firms with centralised IT department were more likely to excel in their IT governance practices. It appears that centralised IT structure resulted in improved practices. This supports the finding by Huang *et al.* (2009) and ITGI (2006).

Recommendation: Larger SMEs could use centralised IT structures to improve IT Governance practices. Centralised IT structure facilitates alignment as it ensures a close relationship between IT and business managers ITGI (2006), efficient allocation of resources, and operational efficiency (Huang *et al.*, 2009). From this research, IT Risk Management and IT Performance Management may be added. Larger SMEs may have the resources to set up such a structure and derive the benefits thereof. In smaller SMEs, a designated role for IT governance could facilitate relationships, and thereby, contribute to IT value (Ward & Peppard, 2005).

Finding: The provinces differed in IT Resource Management. Location, therefore, influenced this practice in SMEs. The firms in Gauteng, which may derive benefits from industry clusters, outperformed the other provinces.

Recommendation: Networking, IT outsourcing and government support could improve IT Resource management. SMEs can take advantage of alliances with other firms, both large and small, to improve IT infrastructure as well as technical and managerial expertise. As borne out by the results of this research, firms located in provinces which lack IT infrastructure and expertise (e.g., Eastern Cape) may use the services of external agencies to improve resource management. However, such firms should not entrust IT governance to the external agencies. Government support, in the form of infrastructure and training, may also contribute to improving resource management and IT governance in general.

Finding: The industry type influenced practices in SMEs. The industries differed in all practices, except IT Resource Management.

Recommendation: Firms could focus on the IT governance practices which are essential to their industries to achieve IT value. As explicated elsewhere, different industries have different business operations, and therefore different IT requirements. Thus, some practices may be essential to an industry. For example, Kankanhalli *et al.* (2003) found that the financial industry is more concerned with information security (i.e., risk management). Industry sectors could identify the practices essential to their business operations, and on which firms may focus their initial stages of IT governance implementation, to improve IT value. In addition, industries may develop sets of best practices for achieving IT governance maturity.

Finding: Improving an IT governance practice may lead to an improvement in other practices and in IT value; an improvement in the latter may contribute to improved practices.

Recommendation: Identify the goal to achieve with IT and leverage existing governance arrangements to improve practices to achieve the goal. Due to the lack of expertise and financial resources, an overarching IT governance framework may be costly to implement in SMEs (O'Dohonue *et al.*, 2009). It appeared that the perceived IT value in the participating firms related to compliance and security. The firms may focus on the basics of IT governance, as described in the model, to improve practices and,, thereby, achieve the perceived IT value (ITGI, 2006).

5.3 Contribution

This research makes contributions to the literature, theory and practice in the field of IT governance. It contributes to the existing literature by providing empirical evidence on the practices in SMEs. Second, it contributes to the existing theory by building on the dimensions of IT governance defined in the literature by identifying some of the managerial, organisational and external factors which affect IT governance practices. Further, it empirically establishes the relationship among the practices and IT value. Lastly it makes recommendations for practice and provides a simple model for improving IT governance in SMEs.

5. 4 Conclusion

The purpose of this research was to gain insight into IT governance practices in SMEs. The objectives were to describe the practices, identify managerial, organisational and external

characteristics which impact on these practices and to provide a model for assisting SMEs to improve their IT governance. The findings lead to three overarching conclusions. First, the firms did not have effective IT governance practices; most were unfamiliar with the ECT Act and IT governance frameworks, and had not implemented any such frameworks. Second, it was found that some managerial (position and background of a manager), organisational (size of firm and IT structure) and external (location and industry type) affected IT governance practices in SMEs. Lastly, there were significant correlations among the practices, on the one hand, and among the practices and IT value on the other.

These findings have implications for practice and research in IT governance: there is no "one-size fits" all approach to IT governance. Policy makers and agencies responsible for promoting IT in SMEs need to focus on IT governance practices to improve IT value, taking into cognisance the diversity of the sector. Management involvement is essential to creating the necessary structural and relational mechanisms for IT governance to be effective. In addition, operational managers must be involved to harness their expertise. Lastly, further studies should be undertaken to provide in-depth understanding of IT governance in SMEs.

5.5 Limitations

While this research makes several contributions to the field of IT governance in SMEs, the researcher recognises that, as with all research, it has limitations. The nature of the phenomenon, practical research design decisions and the inherent weaknesses in sampling, data collection and analysis methods may have affected the reliability of findings and conclusions. IT governance is a complex phenomenon, aspects of which were isolated and investigated. Therefore, this research cannot claim to have considered the plethora of factors that impact on IT governance in SMEs. Many factors (e.g., participation of employees, incentives, relationships with larger firms) were not considered for investigation. Consequently, the findings may be treated with caution.

Governance is an ongoing process. While the cross-sectional approach has established factors of influence and identified relationships, it could not establish causality. Therefore, for most part, the explanations of the results were based on the researcher's interpretation. A longitudinal research could address the issue of causality, and thereby assure an empirical basis for interpretations.

The data collection method relied on self-reporting, which is prone to bias. IT governance is a sensitive subject and the respondents may have given socially desirable answers, which may have affected the veracity of findings (Leedy & Ormrod, 2005; Walliman, 2005). Love *et al.* (2005) also conclude that strategic benefits of IT are subjective, and therefore difficult to quantify. The questionnaire solicited perceptions on strategic issues, which may have caused respondents to give inaccurate responses. Method triangulation could have been used to corroborate findings. However, this could not be undertaken due to practical constraints. First the research was designed to use two data sources from each participating firm but only four paired responses were received. This was considered too small for statistical analysis. Second, due to time constraints, interviews could not be conducted to corroborate the results of the survey. Future research may endeavour to ascertain the veracity of the findings.

The final sample size of 67, although representative of the sample frame and acceptable for statistical analysis, was small and could have affected the accuracy of the analysis, findings and conclusions. For example, it is acknowledged that a large sample produces a more accurate and interpretable factor solution. SMEs are not homogeneous and therefore the findings and conclusions may not be generalised across the sector. The sample was drawn from four industries in three provinces. While it may be relevant to other SMEs, the findings and conclusions may be applicable only to firms in the selected sectors and provinces. Lastly, the model could not be tested and refined.

5.6 Future Research

This research has provided insight into IT governance in SMEs, identified some of the factors which influence practices, and established the relationship among the practices on the one hand and among the practices and IT value on the other. It also lays the foundation for future investigation. Three areas have been identified for further research. First a longitudinal research approach could address the issues of causality, and thereby, provide deeper insight into IT governance in SMEs. Second, the model contained unstable factors. Future research could focus on the development of a simple tool for governing IT in SMEs by revising and testing the model. Lastly, this research has provided evidence of IT governance practices in SMEs. It may be instructive to know how these practices are undertaken. A research strategy which employs qualitative methods may provide in-depth knowledge.

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Appendices

Appendix A: Cover Letter

Department of Information Systems
Leslie Commerce Building Engineering Mall
Upper Campus
Or Private Bag
Rondebosch, 7701
Tel: +27 21 650-2261
Fax No: +27 21 650-2280

10 February 2009

Dear Sir/Madam

Participation in Research Survey

I am a post-graduate student at the Department of Information Systems at the above-mentioned University. I am currently studying for a master degree. As part of my dissertation, I am conducting a survey on Information Technology Governance practices in Small and Medium Enterprises (SMEs). The findings could, among other things, assist SME to effectively use Information Technology (IT). Your participation will therefore be greatly appreciated.

Participation is voluntary. The survey and the questionnaire have been approved by the department's research ethics committee. The researcher will ensure that participants do not suffer any adverse consequences as a result of their participation. The rights of participants to dignity, anonymity and confidentiality will be upheld. The data collected shall be kept safely and securely, and any publication thereof shall not make direct reference to the identity of the participants or their firms. On completion of the research, the data will be disposed of, in accordance with the department's research ethics.

This package consists of *Cover Letter*, *Consent Form* and two copies of a *Questionnaire*. The manager is requested to complete one copy of the questionnaire on behalf of the firm. If there is an IT manager (or someone responsible for IT) in the firm, it will be appreciated if he/she also completes the other questionnaire.

Please return the completed Consent Form and Questionnaire to the researcher by email, fax or post. For further enquiries, contact the researcher or supervisor (details below).

Thank you for your cooperation.

Yours sincerely

signature removed

Charles Boamah-Abu (**Researcher**)
(Charles.Boamah-Abu@uct.ac.za)

signature removed

Prof Michael Kyobe (**Supervisor**)
(Michael.Kyobe@uct.ac.za)

Cover Letter

Appendix A: Cover Letter

Appendix B: Consent Form

Department of Information Systems
Leslie Commerce Building
Engineering Mall. Upper
Campus
Or Private Bag X3
Rondebosch, 7701
Tel: +27650-2261
Fax No: (021) 650-2280

By signing this form, you are agreeing to participate in the research entitled "An Investigation of IT Governance Practices in SMEs in South Africa"

Manager

Signature _____

Date _____

IT Manager

Signature _____

Date _____

Appendix C: Questionnaire

Section 1: Details about you and your firm

1. Select your position in the organisation.

1 Owner-Manager ☐ 2 Chief Executive Officer ☐
3 IT Manager ☐ 4 Other (specify):_____

2. State the number of years of experience in your current position. ____
3. State the number of years of experience in IT Management. _____
4. Select your gender. Male ☐ Female ☐
5. Select your professional background.

1 Business ☐ 2 Information Technology ☐
3 Other (specify): _____

6. State the number of fulltime employees in the firm. _____
7. State the number of years your firm has been in operation? _____
8. State the number of years your firm has been using computers. _____
9. Does your firm a separate IT department? Yes ☐ No ☐

Section 2: IT Governance Practices in your firm

2A. Circle the number corresponding to the extent to which you agree with the following statements:

1= Strongly Disagree 2=Disagree 3=Undecided 4= Agree 5=Strongly Agree.

2A.1						
1	We are familiar with the IT-related *Electronic Communication and Transaction Act (ECTA)* 2002	1	2	3	4	5
2	We outsource IT services	1	2	3	4	5
3	We have formal agreements with IT service providers	1	2	3	4	5
2A.2						
1	Our business strategy is derived from our mission and objectives	1	2	3	4	5
2	Our IT strategy is derived from our business strategy	1	2	3	4	5
3	IT and business managers understand how IT is to be used to achieve the business objectives	1	2	3	4	5
2A.3						
1	We know the total value of IT resources in the firm	1	2	3	4	5
2	We have the IT infrastructure required to achieve our business objectives	1	2	3	4	5
3	We have the IT expertise required to achieve our business objectives	1	2	3	4	5

2A.4						
1	We regularly identify and manage information security risks	1	2	3	4	5
2	We have a policy on data storage, retention and destruction	1	2	3	4	5
3	We have procedures for reporting information security breaches(e.g. virus attack, email misuse, etc)	1	2	3	4	5
2A.5						
1	We identify the benefits or goals to achieve with IT	1	2	3	4	5
2	We regularly measure the benefits of IT	1	2	3	4	5
3	We find it difficult to measure IT benefits	1	2	3	4	5
2A.6						
1	We are familiar with IT Governance tools (e.g. COBIT QuickStart, COBIT, ITIL, ISO 17799, etc)	1	2	3	4	5
2	We have implemented at least one IT Governance tool	1	2	3	4	5

2B. Circle the number corresponding to the extent to which the following occurred during the past year:

1= Not at all 2 = Occasionally 3=Sometimes 4= Most of the time 5=All the time

1	Evaluation and approval of IT investments by IT Committee	1	2	3	4	5
2	Attendance of IT Committee meeting by top management	1	2	3	4	5
3	IT investment decisions based on IT benefit measurement	1	2	3	4	5
4	Evaluation of IT benefits against strategic objectives by an independent, external body	1	2	3	4	5
5	Evaluation of IT risks by an independent, external body	1	2	3	4	5
6	Communicating benefits of IT to employees	1	2	3	4	5
7	IT training for employees	1	2	3	4	5

2C. Circle the number corresponding to the extent to which IT has improved the following in the last two years:

1= Not at all 2 = Slightly 3=Average 4= Strongly 5=Very Strongly

1	Financial growth	1	2	3	4	5
2	Compliance with regulations	1	2	3	4	5
3	Quality of service	1	2	3	4	5
4	Detection of IT security breaches	1	2	3	4	5
5	IT investment decisions	1	2	3	4	5

Appendix D: Ethics Form

Commerce Faculty Ethics in Research Committee

Any individual in the Faculty of Commerce at the University of Cape Town undertaking any research that involves the use of human subjects, or research that may hold ethical consequences for the University of Cape Town, is required to complete this form. The completed form should be submitted to departmental Ethics Committee representatives for submission to the Commerce Faculty Ethics in Research Committee

1. PROJECT DETAILS

Project title: An Investigation of IT Governance Practices in SMEs in South Africa

Principal Researcher: Charles Boamah-Abu **Research Supervisor**: Prof Michael Kyobe

E-mail Address: bmhcha001@uct.ac.za **Email Address**: Michael.Kyobe@uct.ac.za

Brief description of the project: The research investigates strategic alignment and IT asset, risk and performance measurement management practices. It seeks to gain an insight into enablers and inhibitors of IT Governance implementation in SMEs.

Research methods and procedure: (please tick and explain procedure)

□ Interviews ✓ Survey questionnaire □ Experiment □ Secondary data □ Observation □ Other (*please specify*):

The manager and, where applicable IT manager (or someone responsible for IT) of participating firms will be required to complete separate copies of a questionnaire; the data generated will be analysed using quantitative techniques.

4. INFORMED CONSENT

What type of consent will be obtained from study participants?

1. Oral consent
2. Written consent ✓
3. Anonymous survey questionnaire (covering letter required, no consent form needed)
4. Other (*specify*): _____

How and where will consent/permission be recorded? Respondents will be asked to sign a consent form (attached to the questionnaire)

If subjects are minors or mentally incompetent, describe on a separate page how and by whom permission will be granted?

5. CONFIDENTIALITY OF DATA

What precautions will be taken to safeguard identifiable records of individuals? Please describe specific procedures to be used to provide confidentiality of data by you and others, in both the short and long run. This question also applies if you are using secondary sources of data.

Participants will not be asked to provide their own, or their organizations', identity. Participating SMEs will be identified by codes which will be known only to the researcher. Responses will be kept safe and secure, and will be accessible only to researcher and the supervisor. On completion of the research, the data will be disposed of in accordance with the University's research ethics.

2. PARTICIPANTS

Characteristics of participants:

Gender: Male and Female

Race/Ethnicity: N/A

Age Range: N/A

Location: Countrywide

Other: N/A

Affiliations of participants (*please tick*):

✓ Company employees □ Hospital employees □ General public □ Military staff □ Farm workers □ Students □ Other (*specify*)

If your sample includes children (aged 15 and below), mentally incompetent persons, or legally restricted groups please explain on a separate page why it is necessary to use these particular groups

3. ORGANISATIONAL PERMISSION

If your research is being conducted within a specific organisation, please state how organisational permission will be obtained: N/A

4. INFORMED CONSENT

What type of consent will be obtained from study participants?

1. Oral consent
2. Written consent ✓
3. Anonymous survey questionnaire (covering letter required, no consent form needed)
4. Other (*specify*): _____

How and where will consent/permission be recorded? Respondents will be asked to sign a consent form (attached to the questionnaire)

If subjects are minors or mentally incompetent, describe on a separate page how and by whom permission will be granted?

5. CONFIDENTIALITY OF DATA

What precautions will be taken to safeguard identifiable records of individuals? Please describe specific procedures to be used to provide confidentiality of data by you and others, in both the short and long run. This question also applies if you are using secondary sources of data.

Participants will not be asked to provide their own, or their organizations', identity. Participating SMEs will be identified by codes which will be known only to the researcher. Responses will be kept safe and secure, and will be accessible only to researcher and the supervisor. On completion of the research, the data will be disposed of in accordance with the University's research ethics.

6. RISK TO PARTICIPANTS

Does the proposed research pose any physical, psychological, social, legal, economic, or other risks to study participants you can foresee, both immediate and long range? (tick one)

□ **Yes** ✓**No**

If yes, answer the following questions on a separate page:

(a)Describe in detail the nature and extent of the risk and provide the rationale for the necessity of such risks

(b)Outline any alternative approaches that were or will be considered and why alternatives may not be feasible in the study

(c)Outline whether and why you feel that the value of information to be gained outweighs the risks

7. Intended dissemination of research findings

Have you discussed authorship issues with your co-researchers or supervisor? (tick one)

✓**Yes** □ **No**

If yes, what did you agree?: It was agreed that if the results of the research are to be published, the researcher will be listed first

PLEASE ATTACH THE FOLLOWING DOCUMENTS TO YOUR APPLICATION

- **A full copy of the research proposal**
- **Any consent form that will be signed by the participants or read to them (if any)**
- **Any interview schedules, cover letters, forms, instruction sheets, survey questionnaires or other material that will be used in the study.**

I certify that that the material contained herein is truthful and that the supervisor is aware of the contents thereof.

Applicant's signature: Date: 28 Nov 2008

For Ethics committee representative only

Recommendation:

Signature:

Date:

For Ethics committee CHAIRPERSON only

Recommendation:

Signature:

Date:

Appendix D: Ethics Form

Appendix E

Item	Response				
	1	2	3	4	5
ECT Act	13 (19.4%)	12 (17.9%)	11 (16.4%)	**17 (25.4%)**	**14 (20.9%)**
IT Outsourcing	10 (14.9%)	12 (17.9%)	5 (7.5%)	**33 (49.3%)**	7 **(10.4%)**
Agreement	8 (11.9%)	13 (19.4%)	8 (11.9%)	**23 (34.3%)**	**15 (22.4%)**
Business Strategy	4 (6.0%)	3 (4.5%)	13 (19.4%)	**19 (28.4%)**	**28 (41.8%)**
IT Strategy	3 (4.5%)	11 (16.4%)	13 (19.4%)	**20 (29.9%)**	**20 (29.9%)**
Understanding	8 (11.9%)	8 (11.9%)	12 (17.9%)	**21 (31.3%)**	**18 (26.9%)**
Total Resources	6 (9.0%)	9 (13.4%)	11 (16.4%)	**27 (40.3%)**	**14 (20.9%)**
Infrastructure	2 (3%)	9 (13.4%)	14 (20.9%)	**28 (41.8%)**	**14 (20.9%)**
Expertise	4 (6.0%)	14 (20.9%)	12 (17.9%)	**20 (29.9%)**	**17 (25.4%)**
Identifying Risk	2 (3%)	11 (16.4%)	15 (22.4%)	**26 (38.8%)**	**13 (19.4%)**
Data Policy	3 (4.5%)	14 (20.9%)	9 (13.4%)	**32 (47.8%)**	**9 (13.4%)**
Reporting Procedures	3 (4.5%)	11 (16.4%)	13 (19.4%)	**31 (46.3%)**	**9 (13.4%)**
IT Goals	**2 (3.0%)**	**10 (14.9%)**	**16 (23.9%)**	23 (34.3%)	16 (23.9%)
Measuring Benefits	**4 (6.0%)**	**15 (22.4%)**	**16 (23.9%)**	21 (31.3%)	11 (16.4%)
Difficulty to Measure	3 (4.5%)	10 (14.9%)	19 (28.4%)	**23 (34.3%)**	**12 (17.9%)**
Framework Familiarity	17 (25.4%)	11 (16.4%)	13 (19.4%)	**17 (25.4%)**	**9 (13.4%)**
Framework Implementation	26 (38.8%)	12 (17.9%)	19 (28.4%)	**8 (11.9%)**	**2 (3.0%)**
Investment Evaluation	11 (16.4%)	7 (10.4%)	15 (22.4%)	**27 (40.3%)**	7 **(10.4%)**
Attending Meeting	14 (20.9%)	6 (9.0%)	16 (23.9%)	**16 (23.9%)**	**15 (22.4%)**
Investment Decisions	7 (10.4%)	14 (20.9%)	16 (23.9%)	**17 (25.4%)**	**13 (19.4%)**

Table 1.1: Distribution of Responses (IT Governance items)

Item	Response				
	1	2	3	4	5
Benefits by external body	31 (46.3%)	12 (17.9%)	16 (23.9%)	**6 (9.0%)**	**2 (3.0%)**
Risk by external body	30 (44.8%)	15 (22.4%)	16 (23.9%)	5 (7.5%)	**1 (1.5%)**
Communication	6 (9%)	6 (9%)	12 (17.9%)	**32 (47.8%)**	**11 (16.4%)**
Training	3 (4.5%)	3 (4.5%)	13 (19.4%)	**29 (43.3%)**	**19 (28.4%)**
Financial Growth	2 (3.0%)	7 (10.4%)	15 (22.4%)	**30 (44.8%)**	**13 (19.4%)**
Compliance	6 (9.0%)	14 (20.9%)	20 (29.9%)	**19 (28.4%)**	**8 (11.9%)**
Quality of Service	0 (0%)	1 (1.5%)	18 (26.9%)	**34 (50.7%)**	**14 (20.9%)**
Security	4 (6%)	13 (19.4%)	23 (34.3%)	**21 (31.1%)**	**6 (9.0%)**
Investment	***1 (1.5%)***	***9 (13.4%)***	19 (28.4%)	**28 (41.8%)**	**10 (14.9%)**
N=67					

Table 1.1 (continued)

Item	Range	Mean	SD	Skewness	Kurtosis
ECT Act	4.00	3.10	1.44	-0.16	-1.33
IT outsourcing	4.00	3.22	1.29	-0.56	-1.02
Agreement	4.00	3.36	1.35	-0.42	-1.09
Business strategy	4.00	3.96	1.16	-1.05	0.46
IT strategy	4.00	3.64	1.20	-0.51	-0.79
Understanding	4.00	3.49	1.33	-0.58	-0.79
Total Resources	4.00	3.51	1.22	-0.66	-0.51
Infrastructure	4.00	3.64	1.05	-0.59	-0.28
Expertise	4.00	3.48	1.25	-0.36	-1.01
Identifying Risk	4.00	3.55	1.08	-0.44	-0.57
Data Policy	4.00	3.45	1.10	-0.56	-0.64
Reporting Procedures	4.00	3.48	1.06	-0.60	-0.33
Identifying IT goals	4.00	3.61	1.10	-0.43	-0.62
Measure Benefits	4.00	3.30	1.17	-0.20	-0.90
Difficult Measuring	4.00	3.46	1.09	-0.37	-0.80
Framework Familiarity	4.00	**2.85**	1.41	0.00	-1.33
Framework Implementation	4.00	**2.22**	1.18	0.46	-0.87
Investment Evaluation	4.00	3.18	1.25	-0.54	-0.79
Attending Meeting	4.00	3.18	1.43	-0.29	-1.19
Investment Decisions	4.00	3.22	1.28	-0.17	-1.03
Benefit by ext body	4.00	**2.04**	1.16	0.75	-0.48
Risk by ext body	4.00	**1.99**	1.07	0.73	-0.44
Communication	4.00	3.54	1.15	-0.87	0.08
IT Training	4.00	3.87	1.03	-1.02	0.98
Financial Growth	4.00	3.67	1.01	-0.67	0.11
Compliance	4.00	3.13	1.15	-0.15	-0.75
Quality of Service	3.00	3.91	**0.73**	-0.10	-0.53
Security	4.00	3.18	1.04	-0.21	-0.47
Investments	4.00	3.55	**0.96**	-0.37	-0.35
N=67					

Table 1.2: Central Tendency, Dispersion and Shape (Distributions of Responses)

Appendix F: Factor Analysis (Maximum Likelihood Method) Solutions

Items	Factor					
	1	2	3	4	5	6
ECT Act	0.07	0.59	0.27	0.38	0.12	-0.21
IT outsourcing	0.15	-0.15	0.20	-0.04	0.11	0.22
Agreement	0.28	0.55	0.28	0.32	0.18	0.15
Business strategy	0.22	0.41	0.04	0.50	0.34	-0.14
IT strategy	0.11	0.52	0.26	0.42	0.35	-0.08
Understanding	0.15	0.56	0.37	0.51	0.21	-0.20
Total Resources	0.25	0.41	0.34	0.54	0.12	-0.15
Infrastructure	0.23	0.34	0.06	0.47	0.26	0.02
Expertise	0.07	0.43	0.08	0.57	-0.12	-0.05
Identifying Risk	0.12	0.41	0.24	0.58	-0.32	-0.01
Data Policy	0.08	0.57	0.15	0.46	-0.15	0.23
Reporting Procedures	0.03	0.50	0.19	0.47	-0.33	0.20
Identifying IT goals	0.02	0.56	0.16	0.41	-0.34	0.05
Measure Benefits	0.16	0.52	0.26	0.56	-0.25	0.16
Difficult Measuring	0.41	-0.18	0.00	-0.15	0.29	0.13
Investment Evaluation	0.51	0.59	0.09	0.08	-0.03	-0.22
Attending Meeting	0.76	0.64	-0.02	0.00	0.00	0.00
Investment Decisions	0.42	0.46	0.27	0.07	-0.07	0.04
Benefit by ext body	0.19	0.46	0.67	-0.16	0.11	0.26
Risk by ext body	0.10	0.51	0.83	-0.13	-0.02	-0.03
Communication	0.40	0.46	0.14	0.24	0.33	0.24
Training	0.30	0.32	0.09	0.18	0.46	0.38
Financial Growth	0.19	0.19	0.29	0.12	-0.18	0.13
Compliance	-0.25	0.55	-0.06	0.14	0.18	0.01
Quality of Service	-0.02	0.26	0.31	0.02	0.18	0.21
Security	-0.69	0.72	-0.01	0.00	0.00	0.00
Investments	0.18	0.23	0.29	0.37	-0.32	0.02

Table 1.1: Unrotated Factor Matrix

Item	Factor		
	1	2	3
Business strategy	.71		
IT strategy	.71		
Understanding	.68		
Communication	.64		
Infrastructure	.63		
Total Resources	.61		
ECT Act	.58		
Agreement	.57		
Training	.56		
Attending Meeting	.54		
Investment Evaluation	.51		
Measure Benefits		.79	
Identifying IT goals		.77	
Identifying Risk		.75	
Reporting Procedures		.72	
Data Policy		.64	
Expertise		.60	
Investments		.56	
Benefit by ext body			.96
Risk by ext body			.75
Extraction Method: Maximum Likelihood. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 5 iterations.			

Table 1.2: The Three Factor Solution

Items	Factor			
	1	2	3	4
Business strategy	.70			
IT strategy	.67			
Understanding	.67			
Communication	.66			
Total Resources	.63			
Infrastructure	.62			
Attending Meeting	.59			
Agreement	.58			
Training	.56			
ECT Act	.56			
Investment Evaluation	.53			
Measure Benefits		.79		
Identifying Risk		.75		
Identifying IT goals		.75		
Reporting Procedures		.70		
Data Policy		.60		
Investments		.59		
Expertise		.57		
Benefit by ext body			.95	
Risk by ext body			.74	
Security				.89
Compliance				.60
Extraction Method: Maximum Likelihood. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 5 iterations.				

Table 1.3: The Four Factor Solution

Items	Factor				
	1	2	3	4	5
Measure Benefits	.79				
Identifying IT goals	.77				
Identifying Risk	.74				
Reporting Procedures	73				
Data Policy	.68				
Expertise	.60				
Investments	.57				
Business strategy		.81			
IT strategy		.73			
Understanding		.58			
ECT Act		.52			
Infrastructure		.52			
Agreement		.51			
Benefit by ext body			.93		
Risk by ext body			.84		
Communication				.80	
Training				.65	
Extraction Method: Maximum Likelihood. Rotation Method: Varimax with Kaiser Normalization.					
a. Rotation converged in 6 iterations.					

Table 1.4: The Five Factor Solution

Items	Factor					
	1	2	3	4	5	6
ECT Act	.32	.59	.23	.21	.26	-.01
IT outsourcing	-.02	-.04	.19	-.07	-.26	.19
Agreement	.35	.47	.31	.27	.09	.33
Business strategy	.19	.70	-.02	.18	.09	.19
IT strategy	.21	.68	.24	.13	.18	.19
Understanding	.36	.74	.28	.17	.15	.03
Total Resources	.42	.65	.20	.16	-.02	.04
Infrastructure	.25	.55	.00	.14	.02	.27
Expertise	.56	.43	-.04	.10	.17	.03
Identifying Risk	.74	.33	.07	.10	.08	-.05
Data Policy	.63	.28	.13	.35	.24	.26
Reporting Procedures	.73	.17	.12	.10	.21	.12
Identifying IT goals	.68	.20	.11	0.18	.29	.00
Measure Benefits	.75	.33	.16	0.15	.11	.14
Difficult Measuring	-.26	.03	.04	0.17	-.38	.27
Investment Evaluation	.24	.35	.16	0.68	.04	-.01
Attending Meeting	.24	.26	.13	0.89	-.06	.26
Investment Decisions	.32	.21	.32	0.45	-.04	.11
Benefit by ext body	.18	.12	.81	0.22	.03	.24
Risk by ext body	.25	.21	.90	0.21	.09	-.09
Communication	.18	.43	.21	0.32	.01	.50
IT Training	.04	.35	.19	0.15	-.03	.64
Financial Growth	.35	.03	.26	0.13	-.09	.05
Compliance	.09	.28	.07	0.06	.55	.16
Quality of Service	.08	.14	.39	-0.02	.11	.24
Security	.14	.08	.19	-0.09	.96	.00
Investments	.58	.17	.15	0.10	-.08	-.07
Extraction Method: Maximum Likelihood. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 8 iterations.						

Table 1.5: The Rotated Six Factor Matrix

Items	Factor					
	1	2	3	4	5	6
Measure Benefits	.76					
Reporting Procedures	.74					
Identifying Risk	.74					
Identifying IT goals	.73					
Data Policy	.67					
Expertise	.58					
Investments	.55					
Business strategy		.71				
IT strategy		.69				
Understanding		.68				
Total Resources		.57				
ECT Act		.55				
Infrastructure		.51				
Risk by ext body			.93			
Benefit by ext body			.78			
Communication				.76		
Training				.66		
Security					.97	
Compliance					.56	
Investment Evaluation						.89
Attending Meeting						.59
Extraction Method: Maximum Likelihood; Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations						

Table 1.6: The Six Factor Solution

Appendix G: Comparing IT Governance Variables

Note: Each node shows the sample average rank of the relevant variable; yellow links show significant differences while black show non-significant differences

1. Comparing by Position

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Alignment is the same across categories of Position.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.
2	The distribution of Resource Mgt is the same across categories of Position.	Independent-Samples Kruskal-Wallis Test	.003	Reject the null hypothesis.
3	The distribution of Risk Mgt is the same across categories of Position	Independent-Samples Kruskal-Wallis Test	.002	Reject the null hypothesis.
4	The distribution of Performance Mgt is the same across categories of Position.	Independent-Samples Kruskal-Wallis Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .10.

Figure 1.1: Test Statistics

1.1 Pairwise Comparison

Figure 1.2a: Strategic Alignment

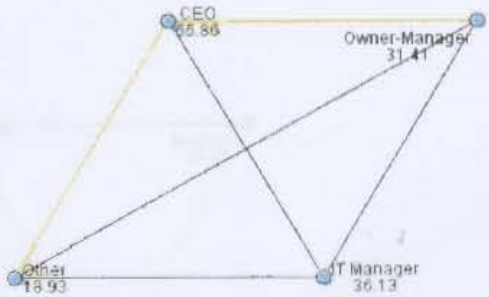

Figure 1.2b: IT Resource Management

Figure 1.2c: IT Risk Management

Figure 1.2d: IT Performance Management

2. Comparison by Background

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Alignment is the same across categories of Background.	Independent-Samples Kruskal-Wallis Test	.013	Reject the null hypothesis.
2	The distribution of Resource Mgt is the same across categories of Background.	Independent-Samples Kruskal-Wallis Test	.209	Retain the null hypothesis
3	The distribution of Risk Mgt is the same across categories of Background.	Independent-Samples Kruskal-Wallis Test	.003	Reject the null hypothesis.
4	The distribution of Performance Mgt is the same across categories of Background.	Independent-Samples Kruskal-Wallis Test	.063	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .10.

Figure 2.1: Test Statistics

2.1 Pairwise Comparison

Figure 2.2a: Strategic Alignment

Figure 2.2b: IT Risk Management

Figure 2.2c: IT Performance Management

3. Comparison by Size

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Alignment is the same across categories of Size.	Independent-Samples Kruskal-Wallis Test	.016	Reject the null hypothesis.
2	The distribution of Resource Mgt is the same across categories of Size.	Independent-Samples Kruskal-Wallis Test	.053	Reject the null hypothesis.
3	The distribution of Risk Mgt is the same across categories of Size.	Independent-Samples Kruskal-Wallis Test	.004	Reject the null hypothesis.
4	The distribution of Performance Mgt is the same across categories of Size.	Independent-Samples Kruskal-Wallis Test	.017	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .10

Figure 3.1: Test Statistics

3.1 Pairwise Comparisons

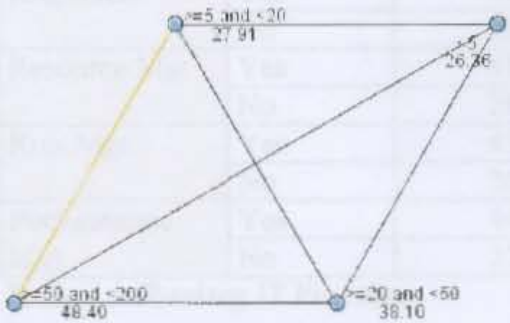

Figure 3.2a: Strategic Alignment

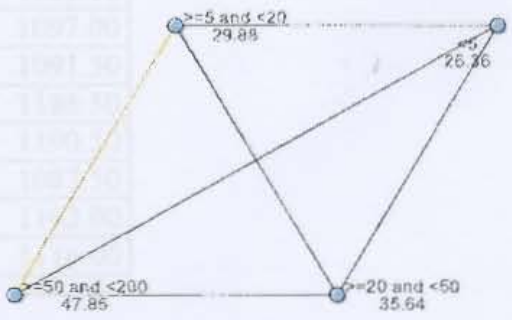

Figure 3.2b: IT Resource Management

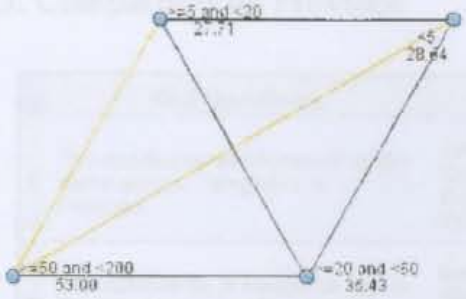

Figure 3.2c: IT Risk Management

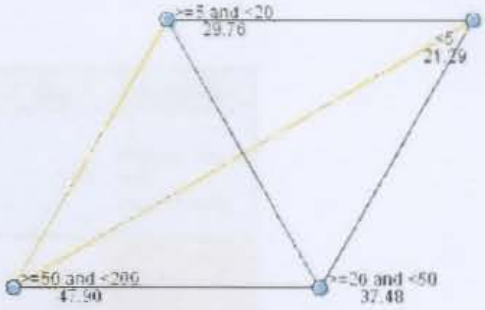

Figure 3.2d: IT Performance Management

4. Comparison by IT Structure

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Alignment is the same across categories of IT dept.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.
2	The distribution of Resource Mgt is the same across categories of IT dept.	Independent-Samples Mann-Whitney U Test	.007	Reject the null hypothesis.
3	The distribution of Risk Mgt is the same across categories of IT dept.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.
4	The distribution of Performance Mgt is the same across categories of IT dept.	Independent-Samples Mann-Whitney U Test	.000	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Figure 4.1: Test Statistics

	IT dept	Mean Rank	Sum of Ranks
Alignment	Yes	45.42	1181.00
	No	26.76	1097.00
Resource Mgt	Yes	41.98	1091.50
	No	28.94	1186.50
Risk Mgt	Yes	45.79	1190.50
	No	26.52	1087.50
Performance Mgt	Yes	44.69	1162.00
	No	27.22	1116.00

Table 4.1: Ranking IT Practices

5. Comparison by Province

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Alignment is the same across categories of Province.	Independent-Samples Kruskal-Wallis Test	.171	Retain the null hypothesis.
2	The distribution of Resource Mgt is the same across categories of Province.	Independent-Samples Kruskal-Wallis Test	.056	Reject the null hypothesis.
3	The distribution of Risk Mgt is the same across categories of Province.	Independent-Samples Kruskal-Wallis Test	.283	Retain the null hypothesis.
4	The distribution of Performance Mgt is the same across categories of Province.	Independent-Samples Kruskal-Wallis Test	.130	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .10.

Figure 5.1: Test Statistics

5.1 Pairwise Comparison

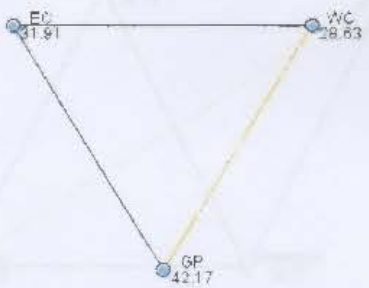

Figure5.2: IT Resource Management

6. Comparison by Industry

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Alignment is the same across categories of Industry.	Independent-Samples Kruskal-Wallis Test	.010	Reject the null hypothesis.
2	The distribution of Resource Mgt is the same across categories of Industry.	Independent-Samples Kruskal-Wallis Test	.501	Retain the null hypothesis.
3	The distribution of Risk Mgt is the same across categories of Industry.	Independent-Samples Kruskal-Wallis Test	.068	Reject the null hypothesis.
4	The distribution of Performance Mgt is the same across categories of Industry.	Independent-Samples Kruskal-Wallis Test	.022	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .10.

Figure 6.1: Test Statistics

6.1 Pairwise Comparison

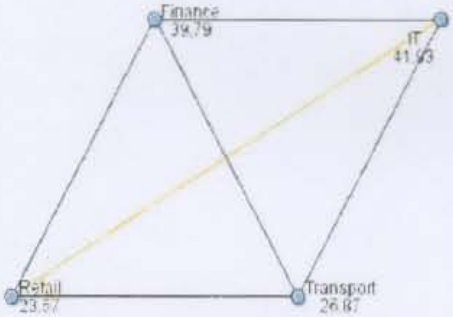

Figure 6.2a: Strategic Alignment

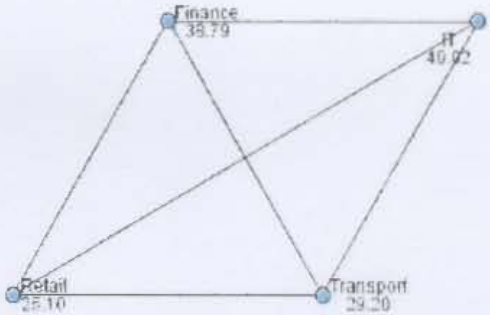

Figure 6.2b: IT Risk Management

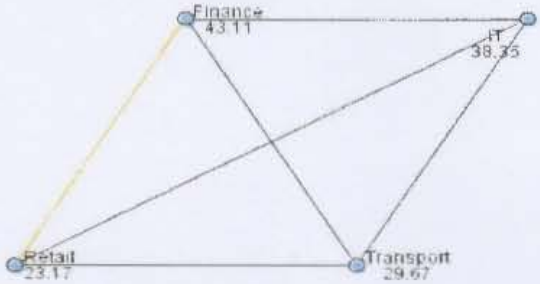

Figure 6.2c: IT Performance Management