

**A proposed
project risk management framework
in the information technology environment**

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ABSTRACT

Information Technology (IT) projects that resulted from the accelerated technological pace of change, will enable a path of growth and long term return on investment (ROI) for organisations. However, embarking on such large scale investments leave little opportunity to turn back, and sound project management principles will be required to effectively manage unforeseen issues during the project life cycle, and if these fail, the organisations will be constantly functioning in crisis mode.

The absence of risk control and risk management can be destructive towards overall business performance. Management skills are therefore of paramount importance to reduce direct cost of projects and to handle increased challenges derived from improvements on existing IT infrastructures. The need for a robust risk management framework exists although many industry standard methodologies are available to assist management in the ongoing task of project delivery.

The main objective of the study was to propose a general reference framework that describes an optimal project risk management process plan for IT projects from various industry types in South Africa. The literature study focused on identifying key factors and components within the project risk management academic field. This framework can also be useful to organisations in developing and expanding existing project risk management processes to facilitate the preparation and practical implementation in order to give assurance to stakeholders that all potentially momentous risks are identified and properly managed.

Shareholders require transparency and high standards of corporate governance that must therefore function in an environment that cultivate open communication channels. Shareholder value will be delivered by means of information that is applied through effective knowledge management initiatives and constantly monitored by measurable strategic objectives.

The second part of the study entails an empirical investigation that identified the [1] general project management issues within organisations; [2] perceptions on risk management practices; [3] key factors within project risk management; [4] and

methodologies/frameworks that are applied in practice. The results indicated that it simply will not suffice with only managing some stages of a project cycle. Information audits form an integral part in maximising Information Systems (IS) that must be aligned with the overall organisational strategy. Strategy, performance and sustainability are inseparable assets of any organisation. IT governance perceived by organisations as important, can improve its competitive value with effective risk practises like risk methodology and data management. Knowledge management will lead management towards better competitive positions as well as increasing the overall organisational performance levels. Risks identified must be well documented, and the implementation of risk support systems will enable business management to anticipate future conditions and plan ahead.

Management tools like Prince2 and PMBOK can guide the project management process. None of them, however, ensure project success and the project team must decide on the combination of each tool to implement according to individual organisational needs.

The study further indicated that an organisation must cultivate an open communication channel for identifying and escalating risk and issues. Risk management can be seen as a scientific soul mate to project management with communication lying at the heart of effective risk management. Effective communication will establish critical links between shareholders' needs; information distribution; performance reporting; and management of issues towards shareholders.

Governance, as the binding glue for organisations, has been one of the fastest growing elements of risk management. Performance measurement is paramount to IT governance and must be set and monitored by measurable objectives. COBIT as a comprehensive framework for IT management, promotes an excellent reference model to advance IT governance. King III, as non-legislated code towards JSE Securities Exchange, states that a company should have a risk assessment framework in place to enable management to pro-actively and continuously address risks. Basel II has reached the plateau but its effectiveness purely rests on the

management of financial institutions to extend beyond the regulation alone. Various ISO standards can be used in conjunction with these management tools like the ISO 31000 risk management standard to guide management in the effective implementation of risk practices.

The empirical research indicated that knowledge management will lead organisations towards better competitive positions as well as increasing the organisation's overall performance levels. It further indicated that IT governance can improve an organisation's competitive value with effective risk management practices.

The study revealed that top management involvement is vital with each IT project intervention along with the required sponsor support. Project risk management is not only the project teams' responsibility, but the organisation as a whole. The strategy of an organisation must cultivate an open communication channel within projects; clearly assign roles and accountability; enforce a repository support system to monitor and evaluate risks; and to drive risk awareness throughout the organisation.

Keywords: Strategy; project management; risk management; governance; methodologies; performance; communication; knowledge management; information technology.

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LIST OF ABBREVIATIONS

Basel II	-	Basel II Capital Accord
BCM	-	Business Continuity Management
CIO	-	Chief Information Officer
CEO	-	Chief Executive Officer
CFO	-	Chief Financial Officer
CM	-	Change Management
COBIT	-	Control Objectives for Information and related Technology
CRM	-	Customer Relationship Management
CT	-	Corporate Technology
EIA	-	Environmental Impact Assessment
ERM	-	Enterprise Risk Management
EXP	-	Executive Program
IM	-	Information Management
IS	-	Information Systems
ISACF	-	Information Systems Audit and Control Foundation
ISO	-	International Organisation for Standardization
IT	-	Information Technology
ITIL	-	Information Technology Infrastructure Library
JSE	-	Johannesburg Stock Exchange
KPIs	-	Key Performance Indicators
KM	-	Knowledge Management
NCA	-	National Credit Act (SA)
PDF	-	Portable Document Format
PMBOK	-	Project Management Body of Knowledge
PRAM	-	Project Risk Analysis and Management Guide
Prince2	-	Projects in Controlled Environments 2
PRM	-	Project Risk Management
ROI	-	Return on Investment
SEI	-	Software Engineering Institute
SOX	-	Sarbanes-Oxley Act of 2002 (US)
TQM		Total Quality Management

CHAPTER 1

NATURE AND SCOPE OF THE STUDY

1.1 INTRODUCTION

The purpose of the study is to propose and define a general reference framework that describes an optimal project risk management process plan for information technology projects from various industry types in South Africa.

A vast array of academic articles and research focus on project and risk management practises. However, in this study an attempt will be made to create a general reference framework that combine various project and risk management aspects to supply a holistic approach to managing the critical elements of an organisation's information technology (IT). Companies must develop the mindset and tools to explore the many dimensions of risk with each activity, and opportunity as a passive risk management stance in this dynamic and competitive world will not be sufficient (Crouhy, Galai & Mark: 2006:vii).

Many factors need to be taken into account when starting large information system (IS) projects, and management risk controls are necessary to review projects during development and to assess whether continuing is worthwhile. These management skills of IT-business projects are of paramount importance for two key reasons (McClure, 2007:2):

- Large amounts of direct costs are lost each year due to large and small project failures.
- There are increased challenges towards the public-sector IT organisations to improve IT project effectiveness and efficiencies.

From a survey conducted by Gartner, the respondents, that being the Gartner Executive Program (EXP) members stated that the most important criteria for project success are sound project planning and methods. These results of the study further emphasized the importance of having clearly defined project plans, accurate risk assessment, and effective definition and execution of industry standard

methodologies that effectively manage project delivery. Some of these methodologies include (McClure, 2007:5):

- Project Management Body of Knowledge (PMBOK).
- Prince2.
- Information Technology Infrastructure Library (ITIL).

This chapter contains the problem statement and a discussion of the research objectives, with reference to the specific objectives as well as the general objectives. The chapter also includes an overview of the research method and concludes with a brief overview of the chapters.

1.2 BACKGROUND

Growth and profitability are exciting words for investors and stakeholders in companies all over the world although they can be illusory and destructive measures of performance in the absence of risk control and risk management (Crouhy *et al.*, 2006:vii).

An organisation may regard Information Technology (IT) as a 'necessary evil', something that is needed in order to stay in business, while others may see it as a major source of strategic opportunity, seeking proactively to identify how IT-based information systems can help them gain a competitive edge. Regardless of the stance taken, once an organisation embarks on an investment of this kind there is little opportunity for turning back (Galliers & Leidner, 2003:1). The primary reason for increased IT risks is due to the accelerated technological pace of change (Kangas, 2003:109). Organisations who fail to conduct an initial business impact assessment of the changes that result from the business process design activity will lead to project cost and schedule overruns (Phelan, 2010:1).

Organisations typically contain a large number of information that must not only be secured but also transformed into value for [1] management to assist in the decision making process; [2] and the positioning of the organisations' competitive stance. Strategies must be developed to manage this information as a resource and to share

existing knowledge within an organisation in order to boost performance. Knowledge management is the combination of strategies, techniques and tools used to capture and share knowledge within an organisation, thus becoming a source of considerable financial advantage for organisations (Chaffey & Wood, 2005:362).

Project environments can benefit from the creation and re-use of knowledge, including lessons learned from previous projects, by reducing the overall project rework cost and time. This gained information from previous mistakes and potential pitfalls should however be well documented to reduce project risk (Pretorius & Steyn, 2005:41-42). The information will only add further value towards the calculated decision-making process; if management is able to integrate their knowledge of IT and their business knowledge (Hampton, 2009:118).

Project issues within the global market are therefore continuously functioning in an environment of total uncertainty that must be properly managed in order to gain competitive advantage.

1.3 PROBLEM STATEMENT

Recent years have seen increased concern and focus on risk management, and it became evident that a need exists for a robust framework to effectively identify, assess, and manage risk. Risks are unavoidable in any project, particularly IT projects, and if project managers do not apply sound risk management principles, the project manager may be constantly in crisis mode (Brandon, 2006:157).

For any risk program to be successful, sound risk-based decision-making is crucial to drive the enterprise toward the formalisation of risk management processes with the required accountability, transparency, and measurability (Proctor, 2009:2).

Risk management is the assessment of potential reasons for failure of projects and developing strategies to reduce risks (Chaffey & Wood, 2005:362). Information project risk management must be carefully evaluated and aligned with the general organisation's strategy as a new IT project has an enormous impact on core business functions.

Risks identification can get very complex and organisations can fail to understand their level of exposure (Hampton, 2009:92). Organisations have two ways to address risk: the wrong way or the right way. The wrong way is to assume that people can understand all the vast amount of risk exposures. This is however not possible and risks and opportunities must be organised and accepted at various levels by risk owners (Hampton, 2009:viii). In order to gain competitive advantage, top management must ensure that information management is executed as an essential asset and that IT projects are not only the IT department's responsibility, but the organisation's as a whole.

An effective IT risk management process provides executives with the required information to implement smart business decisions with confidence in order to reduce, avoid, transfer or live with IT risk (Proctor, Hunter & McKibben, 2008:1).

Governance has been one of the fastest growing elements of risk management, with the separation of risk governance from all IT governance and the layering of risk governance entities that emerged as best practices (Proctor, 2009:6). The Companies Act (71/2008) of South Africa requires the directors to implement and monitor governance models to assist management in the risk process, but no definite model is prescribed as the best or most effective in order to comply.

From the above it is clear that a need exists for a robust risk framework to assist management in the execution of projects; assurance towards shareholders; alignment with business strategies; and required governance practices; as these risks are unavoidable in the IT environment.

1.4 OBJECTIVES OF THE STUDY

The research objectives are divided into general and specific objectives.

1.4.1 Primary objective

The primary objective of this research is to create a general framework for project risk management in implementing IS projects in organisations that are produced using key learning factors of project-, risk- and knowledge management. This framework can be useful to organisations in developing and expanding existing project risk management practices to facilitate the preparation and practical implementation in order to give assurance to all shareholders that all potentially momentous risks are identified and properly managed.

1.4.2 Secondary objectives

The secondary objectives of this research are:

- a) Performing a literature study to obtain a theoretical basis of relevant concepts.

These concepts include:

- Identifying key success factors for project, risk and knowledge management.
- Analysis of risk, project and IT management and all the relevant process phases.
- Governance as part of the organisational strategic layout.
- Evaluation of existing methodologies and frameworks to assist and guide management.

- b) Using the theoretical concepts, a possible approach for project risk management process will be devised to assist in the IT industry.

1.5 SCOPE OF THE STUDY

The study will evaluate best practices for project management from a risk perspective but the underlying implementation and legislation will focus on the South African IT industry. Due to the limited nature of a mini-dissertation and the large academic

practise field within project risk management, the literature study will only attempt to grasp the key factors within these elements.

1.6 RESEARCH METHODOLOGY

This study, pertaining to the specific objectives, consists of two phases, namely a literature study and an empirical study conducted through questionnaires.

1.6.1 Phase 1: Literature review

In phase 1 a complete review is given regarding the topic of the study. The sources consulted include:

- Personal interviews with departmental management and the information technology directors.
- Internet – to identify international rollout strategies and problem areas.
- Library of the North-West University.
- Ebsco Host, Emerald and similar database information libraries to obtain relevant journal information.
- Books regarding information, project, risk and other general business management strategies.

1.6.2 Phase 2: Empirical study

The empirical study consists of the research design, participants, measuring instrument, and statistical analysis.

1.6.2.1 Research design

The aim of the research design is to identify areas of IT projects that will be essential in the evaluation process as to improve the overall results that will be obtained by conducting the research.

Questionnaires will be distributed to management levels within various industries in identifying the different perceptions of general project management; governance effectiveness; and the overall risk management of existing or new projects.

This design will be effective in evaluating the key factors in project risk management at organisations as different perceptions from different industries will be taken into consideration and all relevant management structures will be included to provide a more holistic view of the transition process.

1.6.2.2 Participants

The study made use of a research sampling approach as the population whereby the research was conducted is a finite population from large businesses within South Africa.

Overall, 312 companies were identified, with the target audience aimed at middle- and top management along with an organisation population that consisted mainly of large turnover per annum ratios. The management of each organisation was evaluated by means of questionnaires to identify their various project and risk management perception levels. A convenience sample approach was conducted on the study population which resulted in 61 organisations. Questionnaires were then sent out to 61 organisations out of the 312 original organisations.

A total of 46 valid responses were collected from the population of 61 organisations (75.4% response rate) that received the questionnaires.

1.6.2.3 Measuring instrument

An industry evaluation was conducted by means of questionnaires that address specific factors for identifying and measuring particular project risk areas of success and failure as a result of the existing or new project implementation.

1.6.2.4 Statistical analysis

The relevant questionnaires were evaluated by making use of techniques where specific variables like user perceptions and methodologies were used to calculate specific correlations.

A frequency analysis was conducted to give an overview of all responses. Descriptive statistical methods were used to calculate average values of the different items in the scale.

Results were used to formulate a proposed framework for a general project risk management plan in IT.

1.7 LIMITATIONS OF THE STUDY

The literature review is limited to sources that are readily available on the Internet at the time, as well as publications and books readily available in libraries in South Africa until 15 October 2010.

Change management (CM) as an academic topic was not researched in this study although it forms an integral part of any project. The primary focus was on project and risk management activities.

1.8 CHAPTER DIVISION

The chapters in this mini-dissertation are presented as follows:

Chapter 1: Introduction and problem statement.

Chapter 2: Literature review.

Chapter 3: Empirical study.

Chapter 4: Conclusions and recommendations.

1.9 SUMMARY

Shareholders need the insurance of an effective risk management program within today's constant changing competitive environment. Companies must therefore develop the required mindset and tools to explore the many dimensions of risk as a passive stance will be futile.

Increased concern on risk management principles within the project environment, is forcing management to apply sound risk management principles, as these skills are paramount in order to gain competitive advantage within the IT project environment.

Using the theory principles and the empirical results, the study aims to propose a general project risk management framework for the industries of South Africa.

CHAPTER 2

LITERATURE STUDY

2.1 INTRODUCTION

The management of Information Technology (IT) projects used to be much simpler in the past. Project managers and team members used to focus only on one project, as they were located in close proximity and all the required work was done at the workplace. Today the landscape has become a much more complex environment in which resources are spread all over the world (Brandon, 2006:11). Although most organisations see the importance of sound or best IT practices and most claim to use them, discovering and implementing them is not always an easy task (Cervone, 2008:87).

Risk management has moved from a traditional silo-based approach to a broad enterprise wide approach which is integrated throughout at all levels of an organisation. Many of these implementations were responses to various codes and regulations like (Payne, 2010a:31):

- Basel II
- King III.
- National Credit Act (34/2005) (NCA).

Leaders from modern organisations require the following risk services from a risk management perspective (KPMG, 2008:2):

- Reliable risk governance process.
- Well oiled risk management activities along with pro-active risk awareness.
- Apply risk from an opportunistic perspective.

The Company Act 2008 of South Africa (71/2008) states under the Purpose of Act that the Act encourages transparency and high standards of corporate governance as appropriate, given the significant role of enterprises within the social and

economic life of the nation. The Act further states under the Audit committees' responsibilities that they have to perform functions determined by the Board, including the development and implementation of a policy and plan for a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes within the company. These derived audit reports must be publicly available in order to provide a fertile ground for top management to obtain reasons behind IT project failures (McClure, 2007:3).

Research conducted by Gartner indicated that IT governance must be driven by corporate governance and that IT leaders need to understand these principles and how to obtain executive involvement. Key findings include (Short & Gerrard, 2009:1):

- Corporate governance as an integral input for dealing with IT governance.
- IT governance must ensure that IT risks are effectively managed.
- IT governance requires senior business involvement, especially at the Board level.

It was found by research conducted, that the lack of top management commitment was ranked as the most important risk factor (Smith, Eastcroft, Mahmood & Rode, 2006:64). Top management involvement is an important factor that contributes to the overall IT project success (Brandon, 2006:22).

Regulatory compliance has become an essential element in IT decision-making that will show an increase in compliance cost with each new regulation. These costs will increase more radically if the organisation institutes separate controls for each regulation (Caldwell, 2010:1).

2.2 BUSINESS INFORMATION MANAGEMENT

In the last few years, information technology (IT) has significantly impacted the operations of modern business activities, and even though most corporations still spend only 3% to 8% of their revenues on IT, businesses still depend on IT for day-to-day operations (Brandon, 2006:1).

Information and technology represents the most valuable, but often least understood, asset for many enterprises. Successful organisations understand the benefits and importance of these assets in order to drive their shareholders value (Cobit 4.1, 2007:5). These information technologies however are beginning to cause significant industrial disruptions (Brandon, 2006:3):

- Traditional sales channels are disrupted by internet shopping.
- Software goods like print, audio, video and multimedia are disrupting sales of these traditional intellectual property rights.
- Monopoly telecommunication providers are disrupted by Voice over IP combined with ultra-high-speed optical and wireless media.
- Open source software will start to disrupt the traditional software marketplace.
- Separation of work from workplace will disrupt corporate and personal real estate and related business sectors.
- Distance learning to fulfil the need for retraining and lifetime learning is transforming the traditional higher education landscape.

The access to virtually unlimited information does not mean that knowledge grew side by side with each information stack. The stacks grew much faster than the utilisation of its contents. The current problem that each organisation faces today is that data must be utilised efficiently to provide management with quick, efficient, adequate and correct information to incorporate it into core business functions. It is suggested that while management of explicit knowledge is common in project management, more emphasis should be given to the sharing of tacit knowledge through human interaction (Pretorius & Steyn, 2005:41).

The most reliable recipe for turning companies around and to test managerial excellence is: the excellent execution and alignment of an excellent strategy (Hough, Thompson, Strickland III & Gamble, 2008:17).

The different organisational information management strategy layouts will now be discussed.

2.2.1 Information management strategy layout

Relationships between strategies for managing information-related resources always result in some form of organisational risk. Control and ownership of information management strategies are often following different types of relationships in terms of importance, organisational layout and general company size.

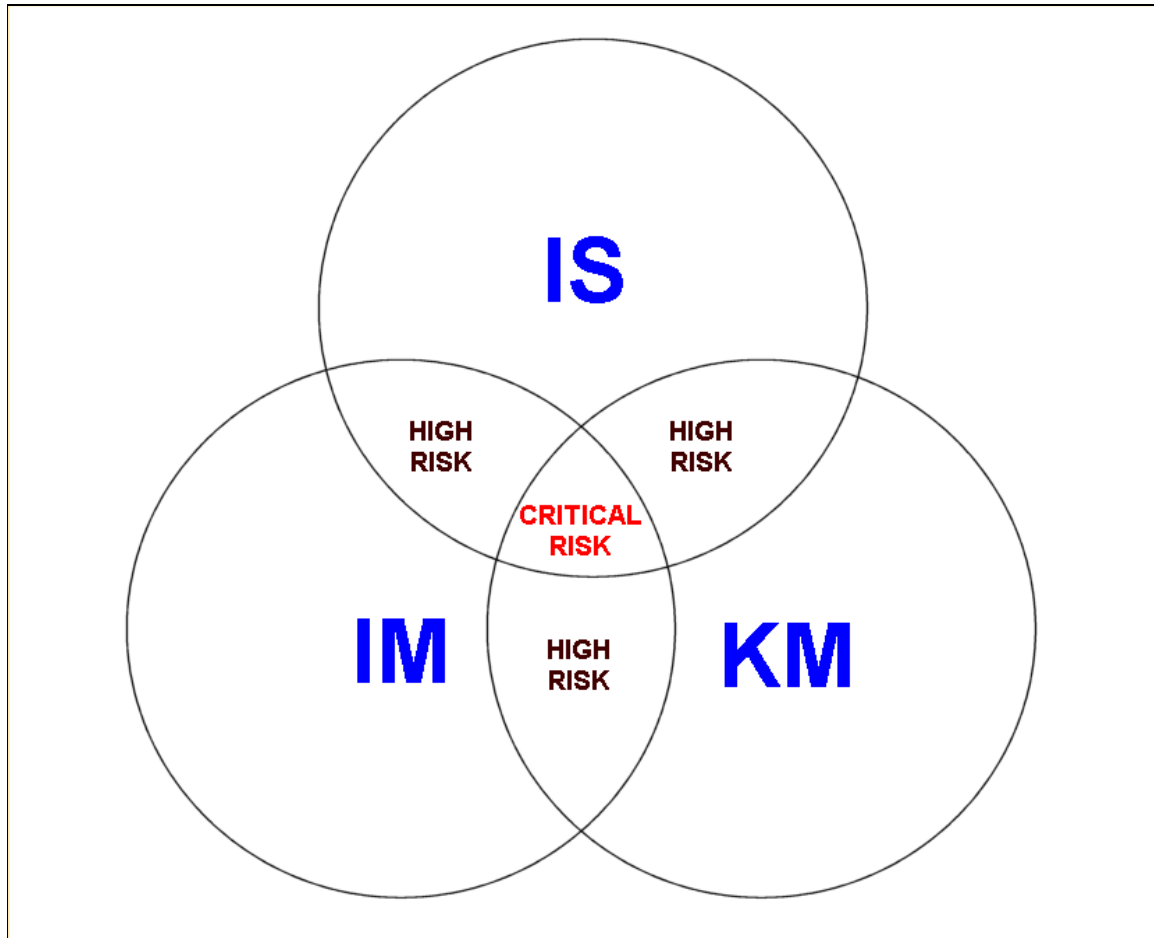
The general, large companies follow a distinct and separate ownership model composed of the following (Chaffey & Wood, 2005:187):

- 1 – IS (Information System) Strategy.
- 2 – IM (Information Management) Strategy.
- 3 – KM (Knowledge Management) Strategy.

This layout, illustrated in figure 2-1 is more appealing than other models in that it emphasises the importance of each individual strategy initiative. It does however carry additional resource overhead in managing each separately and may lead to conflicting resource allocation if not managed properly.

From a verbal communication with Mr. J. Coetzee (2010), the high risk area of risk management need will be where the three strategy types overlap with the most crucial risk area being where all the distinct strategy types overlap. Although risks will be evident all over these individual strategy layouts, the need for effective risk management will increase as each strategy moves towards the utilisation (overlap) of each other's assets like, for example, resources.

Figure 2-1: An ownership information management strategy model



Source: Adapted from Chaffey and Wood (2005:187); Coetzee (2010)

Business value can be increased with each strategy type that is aligned with the overall organisational strategy. Figure 2-2 illustrates how information systems strategy can provide value to an organisation in terms of (Chaffey & Wood, 2005:279) the following:

- Shareholder value is met by aligning the information systems to the business strategies.
- The value is then delivered to the organisation by means of information. Value is not obtained through technology, but through applying information, by improved information flows that require fewer resources, by better quality

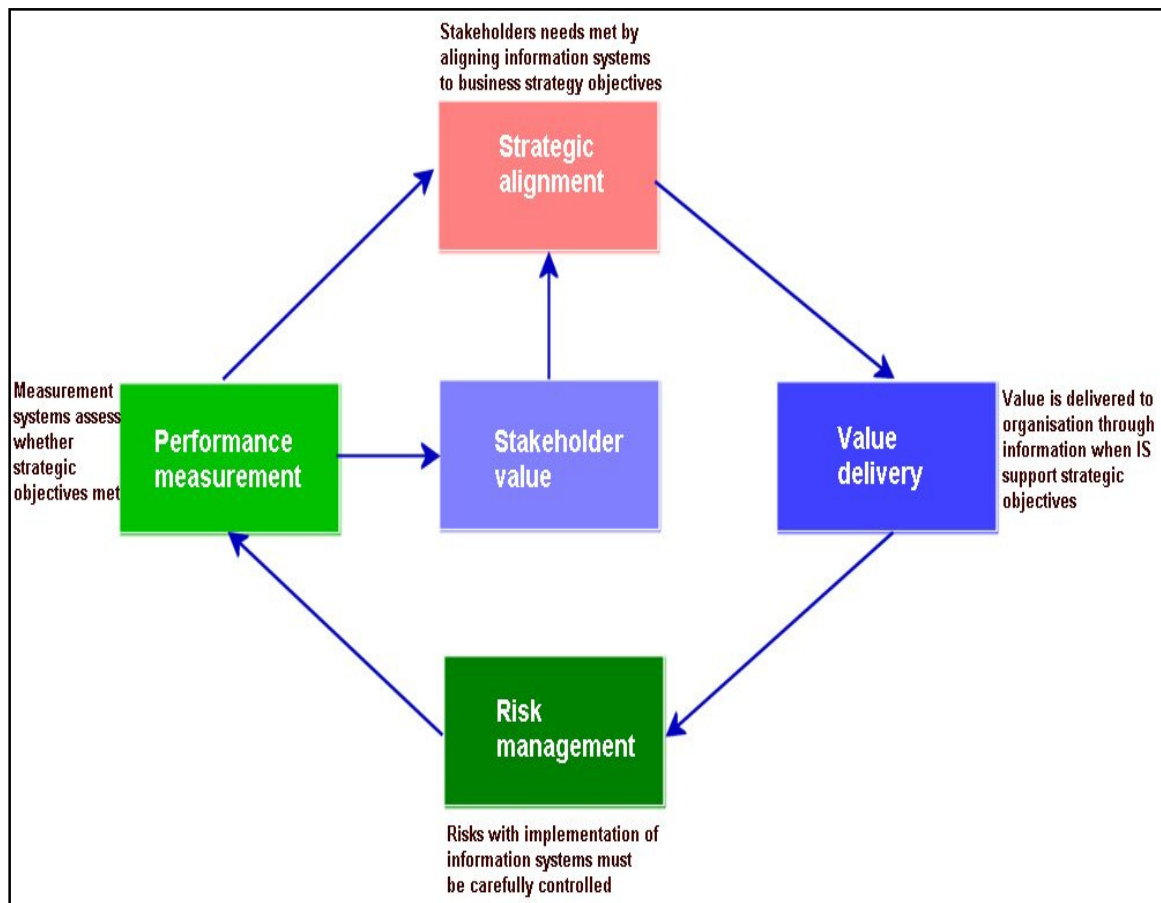
information and knowledge sharing which ultimately improves decision-making (Chaffey & Wood, 2005:6).

- Risk with implementation of IS must be identified and assessed.
- Measurable strategic objectives must be constantly reviewed and communicated to the shareholders.

These information systems must be well managed to gain the required benefits on return on investment (ROI) that include the following components as laid out in figure 2-2:

- Strategic alignment.
- Stakeholder value.
- Value driven delivery.
- Performance measurement.
- Risk management.

Figure 2-2: A model for controlling the contribution of information systems to an organisation



Source: Adapted from Chaffey & Wood (2005:279)

The risk management component must therefore be effectively managed to add value to an organisation, thus the literature study further investigates project management practices and established project methodologies in assisting managers in the ever increasing risks associated with Information System (IS) projects.

2.3 PROJECT MANAGEMENT

Project management is a well developed domain for the exercise of professional expertise and as an area for academic research and discourse. Although large numbers of methods and techniques are available, project management seems to be a highly problematic endeavour (White & Fortune, 2002:1). From an informal

research conducted by Gartner where dozens of clients felt that their business application projects were at risk of failing, they found that the key contributor to the failures was the mishandling of the organisational changes associated with the project (Phelan, 2010:2).

The identification, relationship with and management of a project's stakeholders is vital to the complete success of a project. Well-planned and properly executed projects may still fail if a relationship gap exists between the project manager and various stakeholders (Brandon, 2006:11).

Stakeholders involved in a project may be many and possibly diverse in several respects including interests, needs, expectations, and priorities. Two types of project organisations exist namely (Brandon, 2006:9):

- Performing organisation – organisation or person doing the physical work.
- Benefiting organisation – organisation or person paying for and benefiting from the project initiative.

These projects also consist of general characteristics that include:

- Temporary endeavour with a beginning and finite end.
- Existence of sub processes or phases.
- Creation of a unique identifiable product or service.
- Purpose driven.
- Consist of interrelated activities.
- Instrument of change.

These project structures contain a process flow with different stages that will now be discussed.

2.3.1 Project management process

Environmental impact assessment (EIA) is a process by which specific information pertaining to environmental effects of a project is collected, impacts predicted and mitigation measurements identified (Wale & Yalew, 2010:3). Legislation of many countries including South Africa requires that EIA be completed prior to project or development implementation.

Project managers use standard approaches to plan and control projects regardless of the type of project. These include five main stages (Chaffey & Wood, 2005:346):

1. **Estimation** – identification of activities that are involved in the project, sometimes referred to as work breakdown structure.
2. **Resource allocation** – allocation of people resources to tasks.
3. **Schedule/plan** – determining the amount of time to complete each task.
Effort time: total amount of work that needs to occur to complete a task.
Elapsed time: how long in time the task will take that is independent on the number of resources allocated to the specific task.
This stage further involves identifying milestones.
4. **Budgeting** – determining the project overall cost that includes people resources, hardware and software requirements.
5. **Monitoring and control** – assessment of the project to ensure that the necessary actions are taken if the project deviates from the existing plan. This can be improved by increasing the frequency of project status reports and review meetings along with the confirmations of the project alignment with the business strategy (Mieritz, 2008:1).

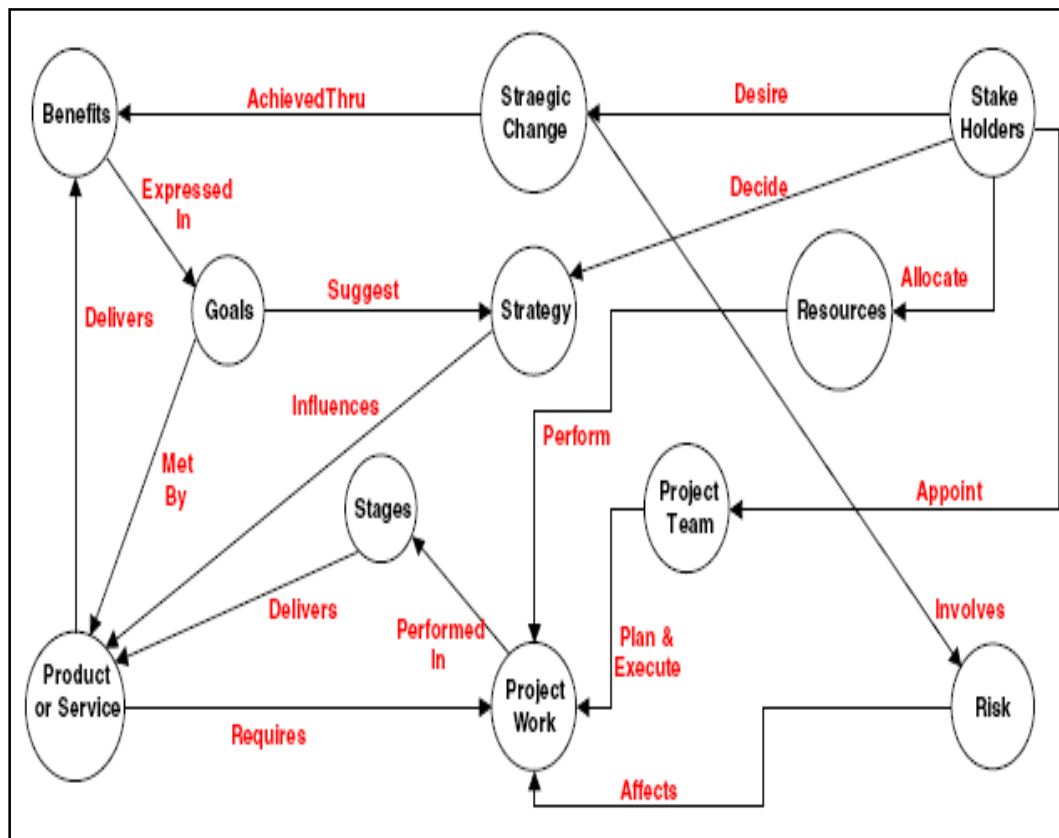
The translation between unforeseen and foreseen risk, management must incorporate the tradeoffs between upfront planning costs and effectiveness with execution costs and effectiveness (De Meyer, Loch & Pich, 2001:7). Management must further take care not to translate all unforeseen risk into foreseen risk that will lead to enormous up-front cost and complexity of the resulting project plan; but also may create complacency in the execution phase, where the project team perceives

the project plan as “perfect”. The result is that project teams no longer scan the horizon for either positive or negative project risks.

Figure 2.-3 further decompiles previous stated main stages into the daily tasks associated with managing a project as perceived by a project manager. These include among others:

- Strategic alignment with the overall business strategy.
- Stakeholder involvement and establishing good relationships.
- Resource allocation.
- Monitoring different stages of project execution.
- Guidance of project teams’ roles and responsibilities.
- Effective risk management due to strategic change.

Figure 2-3: Project management worldview



Source: Brandon (2006:14)

It can be seen that project activities involve a vast variety of management skills that is paramount for effective project execution. Project management is perceived as one of the most valuable skills for IT professionals due to the difficulties in delivering successful IT projects (Brandon, 2006:14).

2.3.2 Knowledge management

The challenge for knowledge management within project environments is the documentation and administration, as well as the distribution and sharing of the newly obtained knowledge (Pretorius & Steyn, 2005:42).

A specific person should be responsible for the management of knowledge within an individual project although the project manager already manages documentation, communication and distribution of information (Pretorius & Steyn, 2005:48).

2.3.3 Information project management

Managing projects to implement information systems is challenging with bad or uninformed information project management that result in large amounts of failure in terms of ROI or completion on time.

Major IT project success factors were identified by Brandon (2006:22) that includes:

- The ability to perform by having the required resources available as projected on the plan.
- Commitment to perform by having top management and sponsor support.
- Methodology that ensures that specific software engineering processes are in place.
- Verification by means of total quality management.
- Technology to support underlying architecture and software structures.
- Project management has the required skills and experience to be proficient in managing and controlling resources and stakeholders.

2.3.3.1 Types of information systems projects

Three main types of implementation related to business information management exist; in some cases however, large-scale projects can involve all three elements (Chaffey & Wood, 2005:338):

- **Operational applications** – ‘mission critical’ systems that are essential to support the manufacture, sale and servicing of products.
- **Information and knowledge management applications** – systems that are used to capture, store and disseminate information within an organisation. These typically include decision support systems for strategic decision-making, intranet, customer relationship management (CRM) system and a

general management control system to improve organisational performance such as a balanced scorecard.

- **Infrastructure development** – projects where technology supporting applications are developed. These typically include the introduction of new hardware, upgrading of networks or deployment of a new office suite.

From a study conducted by Smith *et al.* (2006:55) relating to software projects, the following top ten risks as perceived by project managers were obtained:

- Lack of top management commitment to the project.
- Unclear/ misunderstood scope/objectives.
- Schedule flaw.
- Lack of client responsibility, ownership and buy-in of the project and its delivered systems.
- No planning or inadequate planning.
- Project not based on sound business case.
- Lack of available skilled personnel.
- Not managing change properly.
- Lack of adequate user involvement.
- Poor risk management.

From the previous literature it is already apparent that strategic alignment, top management commitment, lack of the required skill sets, poor knowledge and risk management activities are critical factors that show the way to failure in the project management discipline. Managing systems development requires management to assess appropriate controls for managing the risk inherent in information systems development projects (Chaffey & Wood, 2005:336).

The controls to assist and guide management in the execution of IT projects will now be discussed.

2.3.4 Management tools

A large number of established methodologies are available to guide management in defining standard processes for the project management process. These methodologies tend to vary in popularity in different countries. Some of the most important methodologies will be briefly discussed in the literature following.

2.3.4.1 Prince2

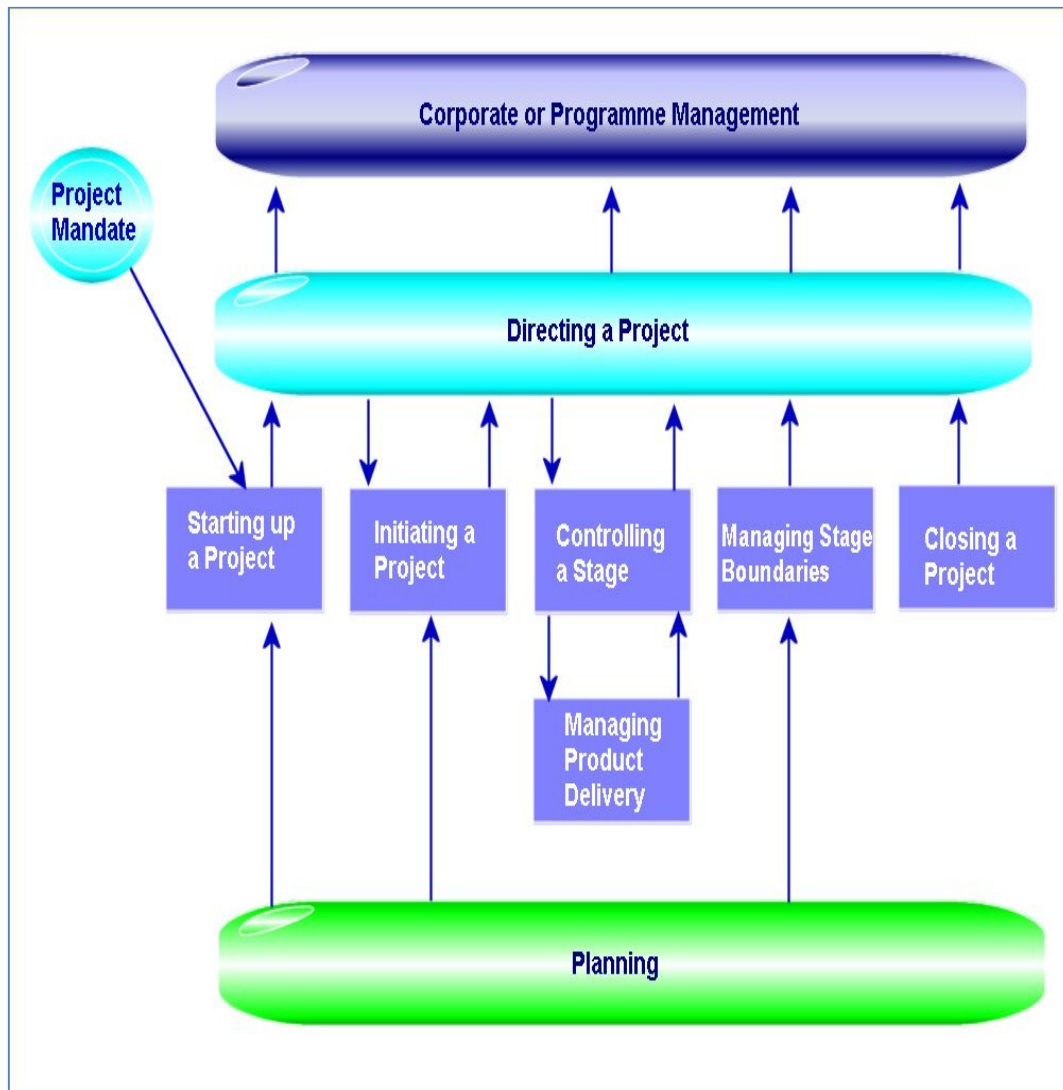
2.3.4.1.1 The Prince2 construct

Prince (Projects in Controlled Environments) is a project management approach that assists in guiding projects along the essentials of project management. It has been introduced in 1989 as a UK government standard for IT project management and has evolved into a de facto standard for project management (Best Management Practice, 2010:1; Prince2, 2010:1).

Prince2 was developed by means of user improvements, project management specialists and a review panel into a more flexible generic tool that can be implemented by all types of projects tailored to individual needs.

In essence (and in a perfect world) it would ensure that each phase of the project lifecycle is completed in the premium detail by the appropriate person and that the project is completed on time using the right resources (Langley, 2006:30).

Figure 2-4: The Prince2 methodology process



Source: Adapted from Chaffey and Wood (2005:350)

Figure 2-4 illustrates some of the main processes within a Prince2 project. The main process controls the start (start-up and initiation), middle (directing a project, controlling and managing stage boundaries) and end (closing a project).

2.3.4.1.2 Applicability to the organisation

Prince2 is more focused on public sector organisations, although there are examples of private sector interest. On the question of who in an organisation should be

Prince2 qualified, it is suggested that senior positions (such as an IT architect) would benefit, but that junior positions (e.g. helpdesk clerk) would probably not gain extensive advantage (Flood, 2006: 25-29). However, the characteristics of Prince2 as described by Chaffey and Wood (2005:349) suggest that the methodology will benefit any organisation requiring:

- Projects are divided into more manageable stages in order to promote monitoring levels.
- Clearly defined roles and responsibilities flexible enough to fit to the size and complexity of a project.
- Projects are more result orientated rather than just simply identifying planning activities.
- Driven by a committed business case that is regularly reviewed.
- Management and shareholders be involved during the project to promote healthy communication.

2.3.4.1.3 Recommended action plans

Prince2 is mainly used in the public sector organisations and appears to function on best practice and should be suited to large companies involved in large-scale projects.

The literature study showed that Prince2, as with any other methodology, is not guaranteed to deliver victory. In addition, Langley (2006:30) accentuates that Prince2 does not address leadership and people management – it is therefore used in conjunction with other project management techniques such as Gantt charts. However, it does cultivate a best practice approach and being an agreed standard, provides for heaps of expertise and advice in the business environment.

2.3.4.2 PMBOK

2.3.4.2.1 The PMBOK construct

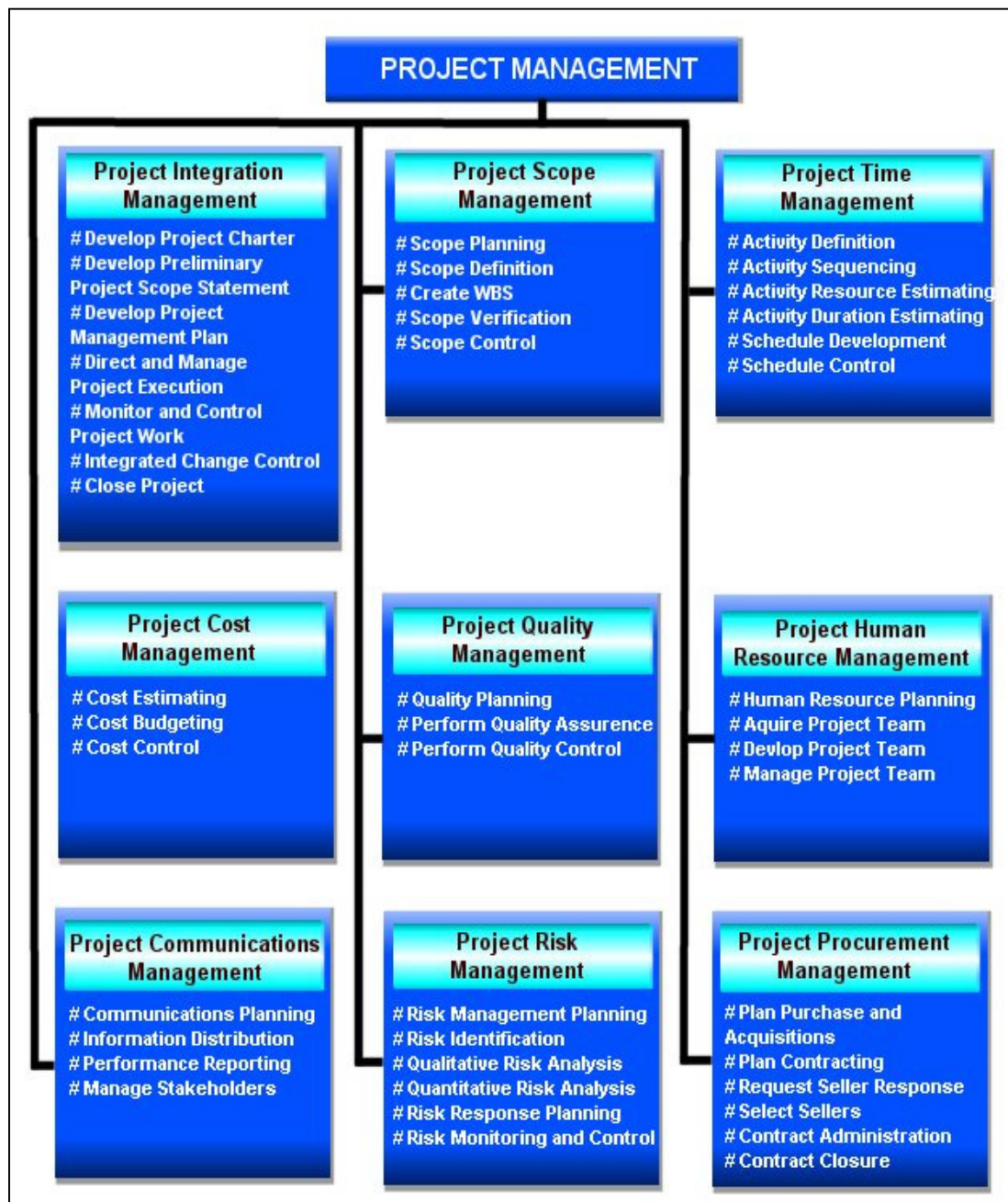
The Project Management Body of Knowledge (PMBOK) is the sum of knowledge within the profession of project management. The PMBOK enhancements rest purely

on practitioners and academics who constantly apply and advance it as it subsist with any other profession. Although the primary purpose of PMBOK is to identify a general acceptable good practice set of tools and techniques that are applicable to most practices, the knowledge obtained from it must be individually applied across projects as the project management team sees most appropriate for any given project (PMBOK, 2004:3).

PMBOK further identifies 5 project management groups that contain a total of 44 project management processes. Figure 2-5 illustrates the discrete elements with well defined interfaces that are interacting with each other.

Project managers must apply and revise some of these repeatable processes based on their project's unique complexity, risk, size, time frame, project team's experience, resource access, amount of historical information, organisation's project management maturity, and industry/application area (PMBOK, 2004:39).

Figure 2-5: Overview of project management knowledge areas and project management processes



Source: Adapted from PMBOK (2004:11)

In order to obtain a comprehensive look on project risk management for the study, the project risk management process as laid out by PMBOK will be briefly discussed.

Figure 2-6: Project risk management overview



Source: Adapted from PMBOK (2004:239)

Figure 2-6 outlines the project risk management process group as follows:

- Risk management planning – this process contains the relevant activities that illustrate how to approach, plan and execute the risk associated with the project.
- Risk identification – determining what the risks are and to document its individual characteristics accordingly.
- Qualitative risk analysis – this is the process necessary for prioritising risks for successive further analysis or action by assessing and combining their probability of occurrence and impact.
- Quantitative risk analysis – process to numerically analyse the objectives of identified risks to determine the impact on the project.
- Risk response planning – identification of opportunities from identified risks and to reduce threats to project objectives.
- Risk monitoring and control – ensure that [1] early risk identification, [2] reporting, and [3] risk execution plans are applied by means of continuous collecting, measuring and disseminating performance information and measurements.

2.3.4.2.2 Applicability to the organisation

Experienced project management practitioners realise that there is more than one way to implement, assess and monitor a project. Management must use the process groups as guidelines to apply the required project management knowledge and skills for their individual project needs (PMBOK, 2004:39).

When organisations initiate the planning process, they will only identify risk after the planning has been completed thereby increasing the cost and schedule targets. These identified risks and interactions must be documented as updates on the project management plan (PMBOK, 2004:46).

2.3.4.2.3 Recommended action plans

PMBOK also provides a common lexicon for project management for discussing, writing, and applying project management concepts. PMBOK does not cover all topics of the profession, as these may be described in more detail in other standards.

Although PMBOK is a good general framework, management must keep in mind that it only focuses on single projects (PMBOK, 2004:4).

Understanding and applying good project management practise is effective but organisations must ensure that additional areas of expertise will be paramount for effective project management such as (PMBOK, 2004:12):

- The Project Management Body of Knowledge.
- Application area knowledge, standards, and regulations.
- Understanding the project environment.
- General management.
- Efficient interpersonal skills.

Risk management should be an integral part of project management as it is highly recommended and recognised by the leading project management institutions like the comprehensive and sound processes provided by PMBOK-2000 and PRAM (Arrow, 2008:3).

2.3.4.3 Prince2 versus PMBOK

These two management tools will now be briefly compared:

- Prince2 is more comprehensive as it can be applied to any project type whereas PMBOK focuses purely on single projects.
- Project teams will use a combination of processes and components from each individual tool as they see best fit to their current environment.
- None of them ensures project success but rather provides a comprehensive set of guiding tools.

From the above literature it is clear that each tool refers to risk management and good governance as the focal point for guidance. The next section will describe these concepts in more detail.

2.4 RISK MANAGEMENT

Risk management is the process of identifying risk, accessing risk, and taking steps to reduce risk to an acceptable level. Risk management further allow IT managers to add stability between operational and economic costs of protective measures that support their critical business information (Stoneburner, Goguen & Feringa, 2002:1-4). Such risks must be further reduced by the development of strategies (Chaffey & Wood, 2005:363).

In any organisation a risk management system must be in place in order to be proactive in the identification and elimination of existing risk areas. In the banking sector where risk management is sometimes perceived as a compliance exercise, risk management programmes should extend beyond the measurement and reporting required for regulators to offer an appreciative of the underlying business practises (Caldwell, 2010:64). In other industries like fund management, risk management is seen as one of the key drivers in ensuring stable shareholder value in the rapidly changing South African regulatory landscape (Smith, 2010:1).

A risk management process involves the following stages (Chaffey & Wood, 2005:363):

- Identifying risks along with its individual probabilities and impacts.
- Find and proactively identify possible solutions to these risks.
- Solutions to the highest-impact and the most likely risks must be targeted.
- Risk must be monitored in order to learn for future risk assessment.

The key benefit of proactive risk management is that resources are assigned to areas where the greatest risk lies, as opposed to where the biggest fires rage. Project risk management is a pragmatic way in achieving project objectives and can be seen as a scientific soul mate to project management in getting things done. Proctor *et al.* (2008:5) define five steps in an IT risk management process (see figure 2-7):

Step 1: Defining the risk policy and standards – identify acceptable and non acceptable activities and deduce standards how to implement them.

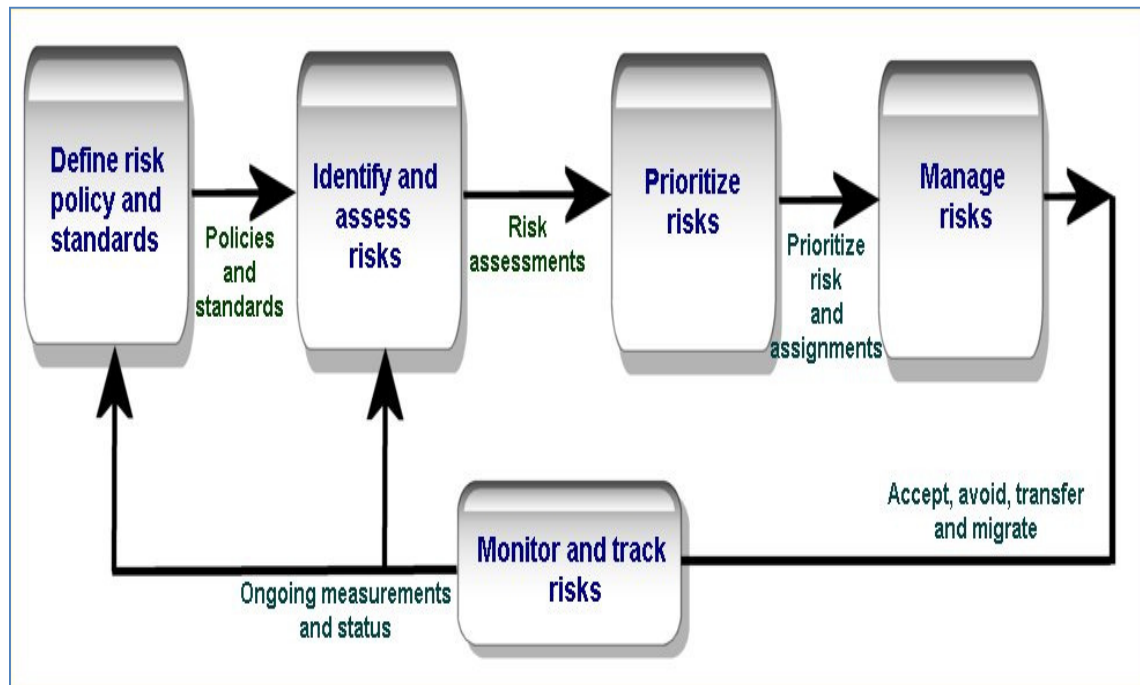
Step 2: Identifying and assessing risks – core of effective risk management as unidentified risk cannot be managed and evaluated.

Step 3: Prioritising risks and assigning responsibility – not the same as assessment in that it comprises the ranking nature of the risk as opposed to the evaluation thereof.

Step 4: Addressing risks – unavoidable process due to financial audit regulations.

Step 5: Monitoring and tracking risks – effectiveness of risk management plans are evaluated.

Figure 2-7: Steps in the IT risk management process



Source: Adapted from Proctor et al. (2008:5)

The biggest problem facing organisations' risk management processes is to create a culture which supports risk management on a daily basis. Organisations must provide every level of resource with the appropriate responsibility for managing risk (Arrow, 2008:7). Morrison, Brown and Smit (2008:27) further add to this in that organisations that are proficient in project management tend to have supportive cultures in place where the entire organisational environment was committed and aligned.

It is essential for any organisation to realise the importance of being committed to addressing the management of risk proactively and consistently throughout the project life cycle in order to be successful (PMBOK, 2004:240).

2.4.1 Determining the risk context

Risk is the effect on uncertainty on objectives (Fouche, 2010:11):

- Where the effect is the deviation from the expected result – can be positive or negative.
- The objectives can be financial, health and safety, environment goals, and can consist at various levels like strategic, organisation wide, product or process.
- Risk is often characterised by reference to potential events and consequences or a combination of both.
- Uncertainty is the state of deficiency in information related to understanding the knowledge of an event, its consequence, or likelihood.

There may be “static” risks, which will lie dormant and maintain its features during their period of existence, but many risks are “dynamic” and can change its probability and impact during the project life cycle (Del Cano & De la Cruz, 2002:474).

Risk does not always present a negative concept, it can also offer opportunities. The pharmaceutical development is a good example where a “side effect” in a drug can also be an additional application of the drug to related disease (De Meyer *et al.*, 2001:6).

2.4.2 Identify the risk

Risk analysis can become a valuable tool in decisions regarding risk management. It should be noted that although management does not always know the real “truth”, a carefully analysed risk analysis, with all assumptions and uncertainties identified, provides the finest available interpretation of existing data (Molak, 1997:19).

2.4.3 Risk models

Qualitative risk evaluations must be used in conjunction with quantitative models to increase risk identification as risk managers fail to see the limitations of established models that reveal inability to identify all of the risk (Smith, 2010:1).

The Software Engineering Institute (SEI) set the stage for modern IT risk management that can be seen as a software engineering practise (see figure 2-8) consisting of the following processes (Brandon, 2006:158):

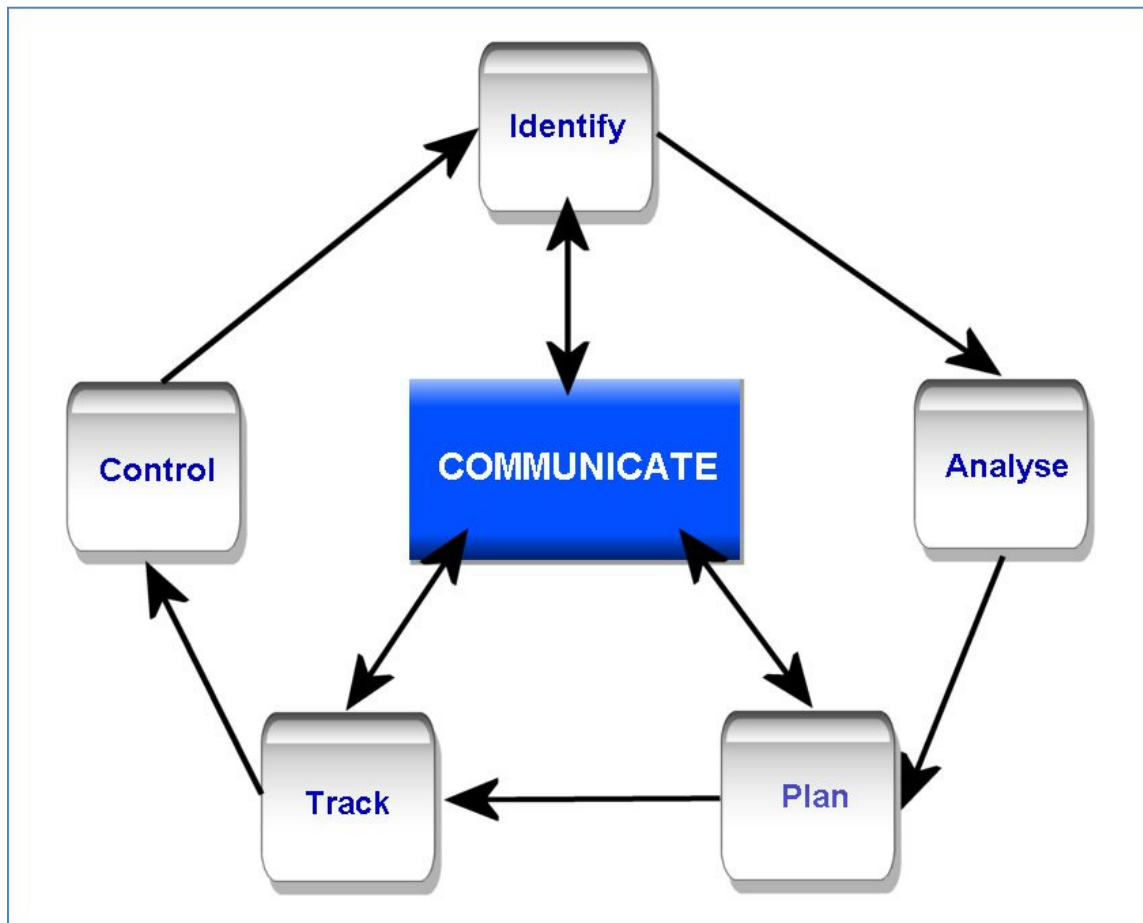
- Continuously identify problem areas – risks.
- Identify risk importance levels in an orderly fashion.
- Implementation of strategies to handle identified risks.

It can be seen that the communication element lies at the heart of this process in order to effectively manage these processes and dependencies. Organisations must cultivate an environment of open communication channels to ensure effective implementation of the SEI risk management model.

Clearly defined roles and responsibilities for all involved within projects should be in place and each individual must understand how communications influence the project as a whole. Project Communication Management provides the critical links among people and information to sustain successful communication and consists of the following processes (PMBOK, 2004:340):

- Communications planning – determine the stakeholders' information and communication needs.
- Information distribution – ensuring that all required information is available when needed.
- Performance reporting – status reporting, progress measurement, and forecasting.
- Manage stakeholders - managing communication and issues towards stakeholders.

Figure 2-8: SEI risk management model



Source: Adapted from Brandon (2006:158)

A typical risk management profile consists of four essential steps (Chaffey & Wood, 2005:213):

- Identify risks including its probabilities and impacts.
- Identify possible solutions to these risks.
- Implementing the solutions targeting the highest-impact, most likely risks.
- Monitor the risks to learn for future risk assessment.

From an IT perspective, these risk management practices can be formalised by dividing it into four phases (Proctor, 2010:2):

- Strategise and plan – develop effective communication plans, identify the scope of risk enclosure, establish resource, budget and governance systems. Strategic alignment with IT risk management.
- Assess the current state – organisation's culture, history, stakeholders, and competencies towards risk. Development of best practices.
- Implement – manage the IT risk management program and work closely with executives to formalize risk acceptance.
- Operate and evolve – monitoring of risk operations and adjust according to new business needs.

From the above it is clear that effective communication channels must be in place within an organisation to manage and monitor risk interventions. These interventions must, however, be applied across the entire organisation. The process regarding enterprise wide implementation will now be briefly discussed.

2.4.4 Enterprise risk management

Enterprise risk is ambiguity about economic loss across the entire organisation, and successful risk management is crucial to the success of the enterprise and its vital business processes (Proctor, 2010:2). Operational and process-level risk examinations are essential as this is where most organisations generate profit and deliver service (KPMG, 2008:3).

Figure 2-9 illustrates that Enterprise Risk Management (ERM) consists of:

- Business Continuity Management.
- Project Risk Management.
- Sustainable Risk Management.
- Operational Risk Management.
- Credit Risk Management.

- Credit Risk Tools.

Business Continuity Management (BCM) is defined by King III as the activity that must be performed in order to ensure that critical business functions will be available to entities like customers and suppliers to be able to use those functions. The complexity implementation of BCM must fit to the level of risk and maturity of the organisation (Payne, 2010b:25).

Key performance indicators (KPIs) for ERM include (Payne, 2009:29):

- Percentage of achievement of organisational and risk management objectives.
- Response success rate to drastic changes in the internal and external environment.
- Quality levels in which management cover the risk monitoring processes.
- Quality of implemented processes and structures to identified risk areas.
- Adequate reporting services.
- Degree of enhancement in the risk management culture.
- Level of maturity of ERM reached in the reporting period.

Figure 2-9: Specialised risk management disciplines



Source: Payne (2010b:24)

The study will now focus on the project risk management component of the ERM construct.

2.5 PROJECT RISK MANAGEMENT

2.5.1 Benefits of project risk management

Effective risk management in projects should (Fouche, 2010:11):

- Create value.
- Be an integral part of an organisation.
- Be part of the decision-making process.
- Explicitly address uncertainty.
- Be logical and structured.

- Based on the best available information.
- Be tailored.
- Should take human factors and errors into account.
- Be transparent and illusive.
- Be dynamic, iterative and responsive to change.
- Be capable of continual improvement and enhancement.

Arrow (2008:1) further supports these benefits by providing a distinction between hard and soft benefits for project risk management as seen in Figure 2-10.

Figure 2-10: The hard and soft benefits of project risk management

<i>'Hard' Benefits</i>		<i>'Soft' Benefits</i>	
H1	Enables better planning, scheduling and budgeting.	S1	Improves corporate experience and general communication.
H2	Increases the likelihood of a project adhering to its schedules and budgets.	S2	Leads to common understanding and improved team spirit.
H3	Leads to the use of the most suitable type of contract.	S3	Helps distinguish between good and bad management (& good and bad luck!).
H4	Allows a more meaningful assessment of contingencies.	S4	Helps develop the ability of staff to assess risks.
H5	Discourages the acceptance of financially unsound projects.	S5	Focuses project management attention on the real and most important risks.
H6	Contributes to the build-up of statistical information for better decision making.	S6	Facilitates greater risk-taking, thus increasing benefits gained.
H7	Enables a more objective comparison of alternatives.	S7	Demonstrates a responsible approach to clients.
H8	Identifies and allocates responsibility to the best Risk Owner.	S8	Provides a fresh view of the personnel issues on a project.

Source: Arrow (2008:1)

2.5.2 Information project risk management

Thriving organisations understand the payback of information technology and use this knowledge to steer their shareholders value. They further recognise the paramount dependence of many business processes on IT, the need to comply with increasing regulatory compliance demands and the benefits of managing risks effectively.

Project risk management (PRM) is a valuable component of project management and has always existed in one form or another like a mental calculation or even a *gut feel*. Today, PRM is widely recognised for its benefits of formally documenting objectives, analysing and transparently managing risk, but there are unfortunately almost as many practitioners as there are approaches to managing risk (Arrow, 2008:1). Risk documentation is often seen as a waste of time by project managers and they tend to skip the risk management process because the sponsor wants them to start quickly (Billows, 2010:1)

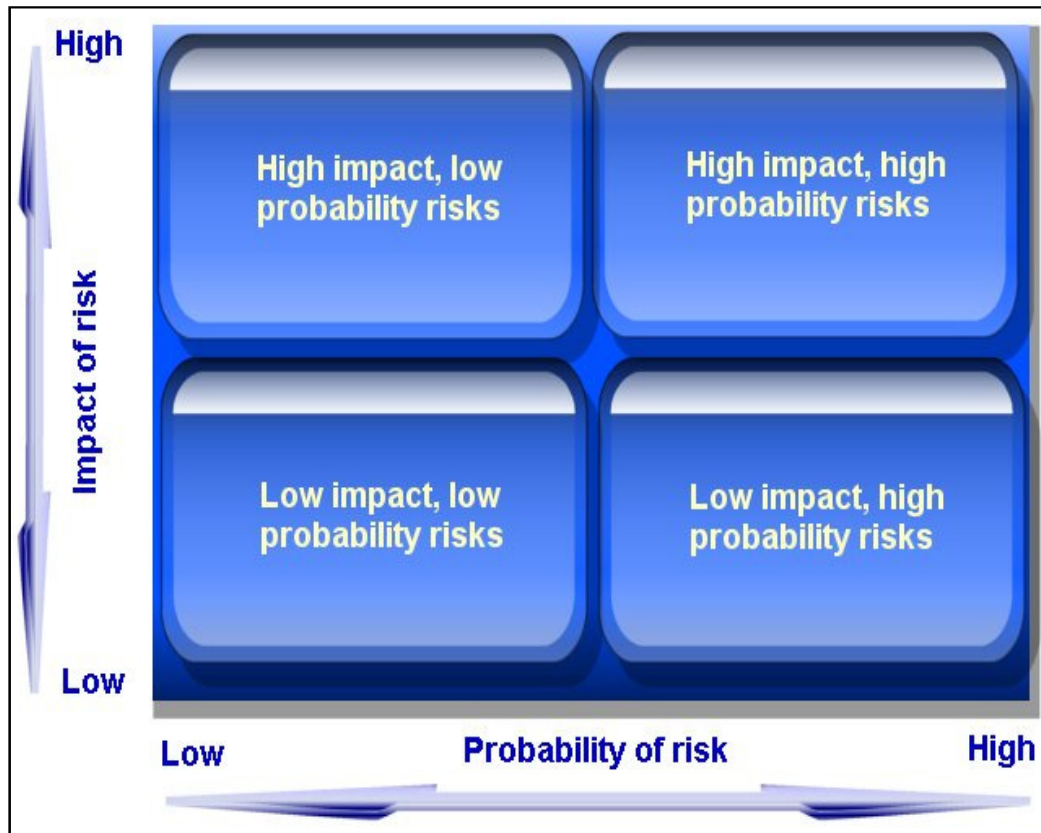
A study conducted by Baccarini, Salm and Love (2004:290) to identify IT project risks that could be seen as most important in terms of their likelihood and consequences, revealed the following top five risks:

- Unrealistic schedule and budget.
- Personnel shortfalls.
- Unrealistic expectations.
- Incomplete requirements.
- Diminished window of opportunity owing to late delivery of the newly developed software.

Management must assess these risks according to its individual categorical level of impact (see figure 2-11). Proctor (2009:3) further adds four risk categories that require distinct approaches to risk assessment:

- Technical risk – technology related vulnerabilities like Internet-based threats.
- Program risk – ill-defined processes that do not provide for effective risk transparency.
- Project risk – associated with specific IT projects or information assets.
- Vendor risk – like external partners and other third parties that are directly linked to the organisation's IT assets.

Figure 2-11: Categories of project risk



Source: Adapted from Chaffey and Wood (2005:363)

Due to the cohesive nature between project risk management and project management processes, risks may be created or minimised. This is illustrated in figure 2-12. Procurement and outsourcing activities in any phase of an IT project may introduce additional risk, bad data quality and HR reports may provide incorrect financial results.

Figure 2-12: Planning influence on risk



Source: Adapted from Brandon (2006:180)

Organisations are open to risk that can surface at any given time and the result can prevent normal operations. Although these incidents are highly improbable, businesses need to implement business continuity management (BCM) to ensure potential events of catastrophic nature (but highly unlikely events) are identified and appropriate response plans are in place (Payne, 2010b:24).

An organisation will go a long way in conducting risk assessment, adopting best practice frameworks in information security management (ISO27001), and providing sound IT governance (COBIT) initiatives (Walters, 2009:50).

Techniques to incorporate sound IT governance will now be discussed.

2.6 GOVERNANCE

Corporate governance is the glue that binds organisations together in the continuous pursuit of its objectives, while risk management provides the resilience (Fouche, 2010:11). Linked with corporate governance is the design and implementation of IT governance that needs to be a cohesive, integrated process (Short & Gerrard, 2009:1).

2.6.1 IT governance

IT governance integrates and institutionalises good practices to ensure that alignment exist between the organisation's IT and the general business objectives of the organisation as a whole. The key elements of enterprise governance include the following (Cobit 4.1, 2007:5):

- Assurance of the value of IT.
- Management of IT-related risks.
- Increased requirements for control over information with value, risk and control as the core drivers of IT governance.

Performance measurement is paramount for IT governance that must be set and monitored by measurable objectives of what the IT processes need to deliver (process outcome) and how to deliver it (process capability and performance) (Cobit 4.1, 2007:6).

The Board is primary responsible for IT governance as laid out in the King III report which also focuses on IT risks that address key governance areas related to IT (Baker, 2010:31). Although such additional regulatory compliance adds more operational weight to an organisation, improved performance and growth will result from the alignment of IT with business to further enable processes and drive innovation (Caldwell, 2010:64).

2.6.1.1 IT governance domains

IT governance domains include (Cobit 4.1, 2007:6):

- **Strategic alignment** – alignment between business and IT objectives.
- **Value delivery** – executing the value proposition throughout the delivery cycle and also to ensure that IT meets its promised return on investment.
- **Resource management** – focus on the key issues of knowledge and infrastructure.
- **Risk management** – require risk awareness by senior corporate officers, a clear understanding of the enterprise appetite for risk, understanding of compliance requirements, transparency about the significant risks to the enterprise and embedding of risk management responsibilities into the organisation.
- **Performance measurement** – tracks and monitors strategy implementation, project completion, resource usage, process performance and service delivery, using, for example, balance scorecards that translate strategy into action.

2.6.1.2 Roles

Corporate Boards and executives perceive risk management as a strategic discipline for improving business performance. They are under more pressure to implement risk management with their auditors, regulators and credit-rating agencies, which calls for effective risk management programs (Caldwell, 2010:27).

It is the executives' and the Board of directors' responsibility to ensure that IT governance is implemented and monitored with the needed leadership, organisational structures and processes to ensure that the organisational IT objectives sustain and extend the overall strategy and objectives of an organisation (Cobit 4.1, 2007:5; King III, 2009; Short & Gerrard, 2009:4).

- Board
 - Overall responsibility for IT governance.
 - Provide a balance between risk and control investment in an often unpredictable environment.

- Senior management
 - Provide ongoing assurance on the security and control measures of the IT services.

The contemporary IT risk manager is likely to work on an overall enterprise governance structure (Proctor, 2009:6).

A lack of Board oversight of IT activities can put an organisation in as much risk as a lack of underlying controls ensuring the quality of financial reporting (Short & Gerrard, 2009:4). Top management involvement in IT risk on the other hand can be improved by implementing an effective IT risk reporting framework that is closely linked to key IT processes (Scholtz, 2009:13). The critical success factors required for the implementation of such a framework consist of the following:

- Close involvement by all parties and the understanding in the identification and assessment of the risks and their relation to the Corporate Technology (CT) process portfolio.
- Allow for customisation in the reporting in order to improve management ownership levels – improving the risk management process.
- Mutual IT process portfolio derived from a combination of sources such as ITIL and COBIT.

The study will now look at literature that supports these governance tools and techniques that can assist managers in managing IT risks.

2.6.2 Governance tools

2.6.2.1 COBIT

The COBIT IT governance model (Control Objectives for Information and related Technology) provides a comprehensive framework to assist in effective management of IT. It also identifies project management as a key process for IT governance and specifies key elements for IS project management activities like risk management, test plans and training plans (Chaffey & Wood, 2005:351).

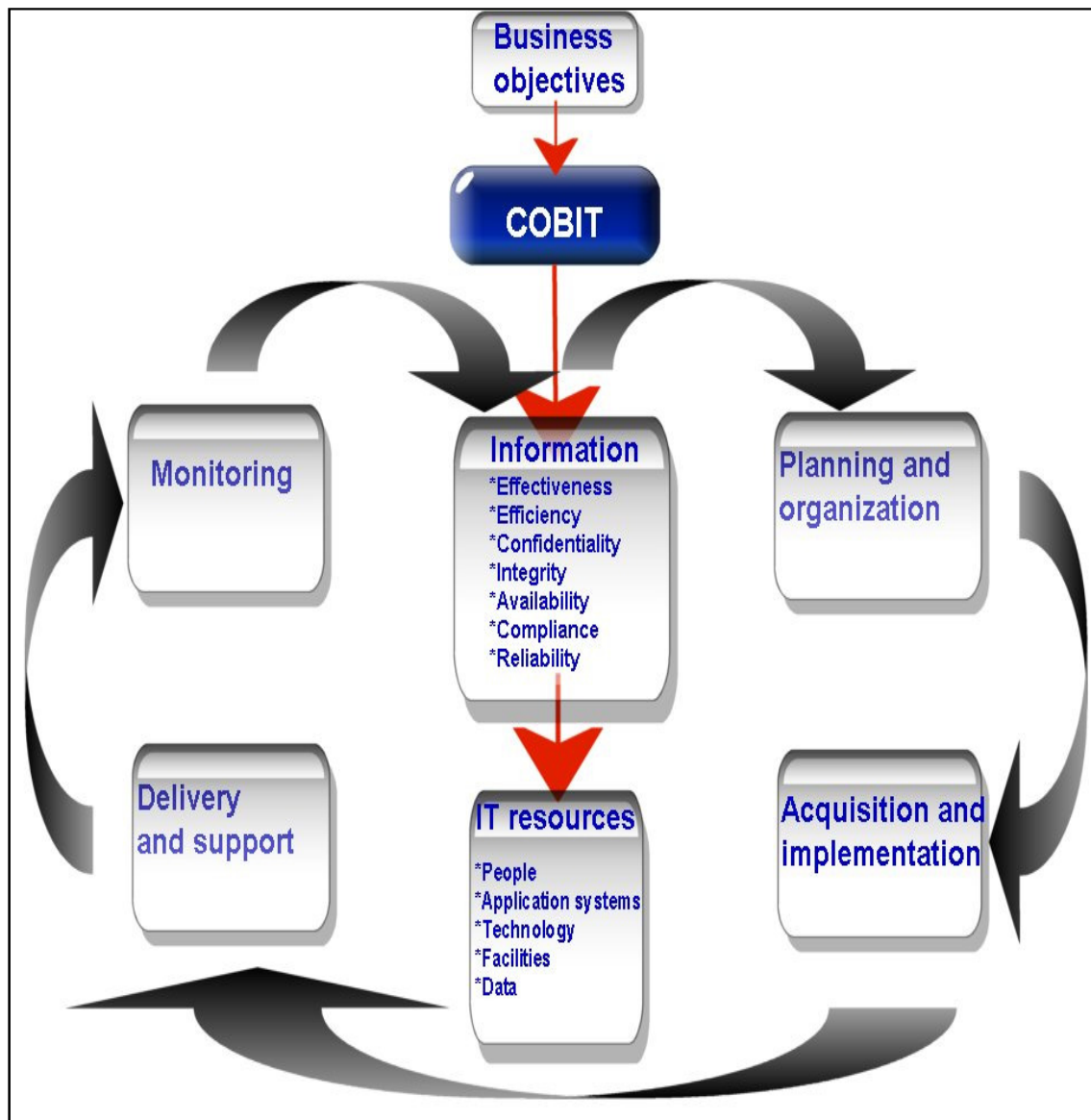
2.6.2.1.1 The COBIT construct

COBIT was developed by the IT Governance Institute and first released by the Information Systems Audit and Control Foundation (ISACF) in 1996 to assist organisations in managing information resources. In contrast with other information systems, COBIT is neither a methodology nor a standard – it is a practical tool focused on delivering quality information (Chaffey & Wood, 2005:10). COBIT focuses on the definition, implementation, auditing, measurement and improvement of controls for specific processes in the IT implementation life cycle, consequently it provides an excellent reference model to promote IT governance across the implementation life cycle (Morency, 2005:34).

COBIT can be grouped into four domains including [1] planning and organisation, [2] acquisition and implementation, [3] delivery and support, and [4] monitoring, and contain a total of 34 control objectives.

Figure 2-13 below illustrates the translation of these 34 IT processes defined in COBIT into four domains for coalition with the IT implementation cycle.

Figure 2-13: The COBIT model



Source: Adapted from Morency (2005:34)

The COBIT package comprises an executive summary providing an overview of its foundational premise, the COBIT framework describing the high-level IT control objectives and business requirements, control objectives to achieve desired results, audit guidelines suggesting audit steps conforming to standard practices, the implementation tool set providing lessons learned by organisations that successfully applied COBIT and tools to assess the organisation's current control environment,

and finally, management guidelines containing critical success factors (CSFs), key goal indicators (KGIs), key performance indicators (KPIs) and maturity models. To clarify the abbreviations used, CSFs suggest what needs to be done from the choices made in the maturity models, whereas KPIs are used for monitoring to determine the probability that the IT process goals set by the KGIs will be reached.

2.6.2.1.2 Applicability to the organisation

The extent to which COBIT is deployed in the organisation depends on the firm's particular needs, and it is suggested that such needs be analysed prior to deployment. COBIT is not limited to the size of an organisation as it has been implemented by thousands of organisations in the past and is applicable to all major product segments such as network, server and storage (Morency, 2005:1).

From a study conducted on Saudi organisations in implementing COBIT it was found that IT specialists, internal auditors, and executive managers perceived and appreciated the importance of COBIT processes more than other employees in the organisations (Ahmad, 2009:73).

2.6.2.1.3 Recommended action plans

COBIT can be seen as a practical tool for information security and IT governance that appears to be well suited for compliance towards Sarbanes-Oxley.

Management should put a control system or framework in place to be successful in delivering against business requirements. The COBIT control framework will assist with these needs by (Cobit 4.1, 2007:5):

- Ensuring that IT is aligned with the business requirements.
- Organising IT activities into a generally accepted process model.
- Identifying key IT resources to be leveraged.
- Defining the management control objectives to be considered.

Although COBIT and ITIL are more complementary than competitive, management would have to investigate the organisation's particular needs. COBIT would probably

be the better choice if the goal is to improve the quality and measurability of IT governance in the network application implementation lifecycle, or to employ a control system to improve regulatory compliance. Conversely, ITIL would probably be more suited for the continuous improvement of IT operations efficiency and IT customer quality (Morency, 2005:37).

COBIT enables managers to bridge the gap with respect to control requirements, technical issues and business risks, and to communicate that level of control to shareholders. It further provides clear policies and good practice for IT control throughout the enterprise and has become the umbrella framework for IT governance (Cobit 4.1, 2007:8; Ahmad, 2009:92).

2.6.2.2 ITIL

2.6.2.2.1 The ITIL construct

ITIL was developed to primarily support Service Management. ITIL version 3 was released in May 2007 (Sante & Ermers, 2009:4).

ITIL is the most widely accepted approach to IT service management in the world that provides a cohesive set of best practice guidance drawn from the public and private sectors across the world. IT Service Management (ITSM) derives enormous benefits from a best practice approach. Because ITSM is driven both by technology and the huge range of organisational environments in which it operates, it is in a state of constant evolution. Best practice, based on expert advice and input from ITIL users is both current and practical, combining the latest thinking with sound, common sense guidance (Best Management Practice, 2010:1).

Cervone (2008:87) argues that although most people say that they moved beyond the traditional total quality management (TQM) and management by objectives (MBO), they do not realise that the most important elements of these methodologies were incorporated in their day-to-day procedures, practices, and processes. Managers get so used to using them that they forget about them as a distinct entity, as the useful parts have just become second nature.

Understanding ITIL is not easy and requires a bit of work. In prior versions of ITIL the methodology was described in a set of nine books but has since been reduced in version 3 to just five books that focus on the following main areas of IT service in a lifecycle approach (Cervone, 2008:89):

(1) Service Strategy – provides information regarding management information technology as an essential part of an organisation. The primary focus of ITIL is to define processes, services, and methods that will most effectively promote success of an organisation as a whole. This book also provides trade-off information within the service portfolio management context which presents approaches in determining when to continue or discontinue services.

(2) Service design – focuses on the identification and development of services that are cost-effective, work according to specifications, while aligning with and promoting the goals of the organisation.

(3) Service transition – identifies that change management is far more complex than was stated and acknowledged in traditional methodologies. Within this construct, best practices are explored that provide for testing and roll out in a guarded manner while balancing the goals of mitigating risk, assuring quality, and promoting agility and responsiveness.

(4) Service operation – supporting and delivery services are the primary focus areas.

(5) Continual service improvement – illustrate how to promote continuous improvement as well as providing pragmatic metrics and measurements related to monitoring quality and cost of services.

ITIL version 3 also adds benefits to the previous version in that it now focuses on people outside of IT and also documents standardised definitions of IT services and processes.

2.6.2.2.2 Applicability to the organisation

ITIL adds value to IT service provision management by means of a systematic and professional approach and by adopting its guidance; it provides companies with the following benefits (Best Management Practice, 2010:1):

- Reduced costs.
- Improved IT services through the use of proven best practice processes.
- Improved customer satisfaction through a more professional approach to service delivery.
- Standards and guidance.
- Improved productivity.
- Improved use of skills and experience.
- Improved delivery of third party services through the specification of ITIL or ISO 20000 as the standard for service delivery in services procurements.

2.6.2.2.3 Recommended action plans

ITIL may be utilised to improve key IT services and the governance of IT operations. These policies and procedures derived from ITIL in return become the controls that can be used by organisations to demonstrate regulatory compliance (Caldwell, 2010:5).

2.6.2.3 King III Report

The framework recommended by King III is principles-based and there is no 'one size fits all' solution. Entities are encouraged to tailor the principles of the code as appropriate to the size, nature and complexity of their organisation. This is good news for companies in South Africa as it avoids some of the pitfalls seen in the United States where a 'one size fits all' approach was initially adopted.

2.6.2.3.1 The King III construct

Mervyn King, an internationally recognised expert on corporate governance developed the groundbreaking King Report on Corporate Governance in 1994 which defined a new governance model for South African companies.

The Johannesburg Stock Exchange (JSE) and the Institute of Directors asked King to write a code of governance that would enable its companies to become fit and look beyond the bottom line. Although this report today seems rather entry level, focussing only on audit compliance and did not even mention risk, King says today that “Strategy was not within its compass; it was completely different”. King II emerged in 2002 that included a much larger section on internal auditing and endorsed International Standards for the Professional Practice of Internal Auditing, and Code of Ethics – that further boosted internal auditing practices in South Africa. King II added risk at the centre of internal audit activity for the first time.

In his latest report, King III, published in 2009, he further promotes professional internal auditing as a crucial ingredient for business success (Baker, 2010:29). King II was a non-legislated code applicable to JSE Securities Exchange listed companies, corporations in the Financial Services sector and public enterprises. King III, however, focuses on all entities regardless of the form of an organisation; it further states that an ‘apply or explain’ should be present to increase the flexibility rather than a traditional ‘comply or explain’ approach (KPMG, 2009:2).

The King III falls within the listing requirements of the JSE; the over 450 companies listed must adhere to this for all year ends commencing on or after 1 March 2010. They must generate an integrated report or explain why they are not conforming (Makwana, 2010:1)

The following section will evaluate the King III report from a risk management perspective.

2.6.2.3.2 King III and risk management

Risk management is an essential element of a company's strategic and business processes. Although risk management may be delegated to a risk committee, it will be the primary responsibility of the Board. Management is responsible for implementing the risk management process that should be continuously assessed and practised by all staff (KPMG, 2009:5-6).

The report further states that a company should have a risk assessment framework in place in order to identify root causes of risk and consider all aspects of risk and risk sources. Risk management must be embedded to allow management to pro-actively and continuously address, understand, minimise and resolve risks (Baker, 2010:31). Continuous feedback and control are essential for effective risk management and management must realise that all project tasks involve risk and require a comprehensive set of skills (Port & Boehm, 2002:49).

The most important risk principles as described in the King III report are as follows (King III Report, 2009:20-110):

- **Principle 1 –strategy, risk, performance and sustainability are inseparable assets.** This principle refers to principle 2.2 that states “The board should appreciate that strategy, risk, performance and sustainability are inseparable”.
- **Principle 2 – governance should manifest into a documented risk management policy and plan.** This principle refers to principle 2.7 and principle 4.1 that state “The board should be responsible for the governance of risk”.
- **Principle 3 – IT governance.** This principle refers to principle 2.8 that states “The board should be responsible for information technology (IT) governance”.
- **Principle 4 – the need and role of internal audit.** This principle refers to principle 2.10 that states “The board should ensure that there is an effective risk-based internal audit”.

- **Principle 5 – audit committee involvement.** This principle refers to principle 3.8 that states “The audit committee should be an integral component of the risk management process”.
- **Principle 6 – identification of risk tolerance levels.** This principle refers to principle 4.2 that states “The board should determine the levels of risk tolerance”.
- **Principle 7 – risk committee involvement and responsibility.** This principle refers to principle 4.3 that states “The risk committee or audit committee should assist the board in carrying out its risk responsibilities”.
- **Principle 8 – management responsibility towards risk management.** This principle refers to principle 4.4 that states “The board should delegate to management the responsibility to design, implement and monitor the risk management plan”.
- **Principle 9 – risk monitoring on continuous basis.** This principle refers to principle 4.5 and principle 4.8 that states “The board should ensure that risk assessment is performed on a continual basis”.
- **Principle 10 – implement correct frameworks and processes.** This principle refers to principle 4.6 that states “The board should ensure that frameworks and methodologies are implemented to increase the probability of anticipating unpredictable risks”.
- **Principle 11 – risk response.** This principle refers to principle 4.7 that states “The board should ensure that management considers and implements appropriate risk responses”.
- **Principle 12 – risk assurance.** This principle refers to principle 4.9 that states “The board should receive assurance regarding the effectiveness of the risk management process”.
- **Principle 13 – risk disclosure.** This principle refers to principle 4.10 that states “The board should ensure that there are processes in place enabling complete, timely, relevant, accurate and accessible risk disclosure to stakeholders”.

Principle 4.6 of King III that identifies the need of implementing frameworks and processes in an organisation further identifies essential characteristics in selecting the structures (KING III Report, 2009:77):

- **Insight** – provide the ability to identify risks that are not immediately obvious.
- **Information** – availability of comprehensive risk sources.
- **Incentives** – ability to separate risk origination and risk ownership ensuring proper due diligence and accountability.
- **Instinct** – ability to think out of the box in terms of systematic and pervasive risks.
- **Independence** – ability to view the organisation independently from the existing operational environment.
- **Interconnectivity** – ability to identify mutual involvement between risks especially when their relatedness might intensify the risk.

From the above, it is clear that the King III report emphasises the integrated risk management function that includes all risks in the organisation – which was not even part of the first version. This clearly indicates that risk management is becoming more apparent as an essential management practice within today's marketplace. The report further states that organisations must implement frameworks, but it still lacks the direction and guidance into which one to implement.

2.6.2.4 Basel II

2.6.2.4.1 The Basel II construct

The Basel I framework was established internationally in 1998 as a banking standard to increase capital levels, a more equitable international marketplace, and closer links between capital banks and their risks. The risk management frontier eventually demanded for a more comprehensive framework that resulted in the Basel II best practice (Gupta, 2009:36).

The Basel II Capital Accord (Basel II) was created by the Bank for International Settlements to assist banks in the alignment of their capital sufficiency assessments with underlying credit, market and operational risk to accurately reflect the adequacy of their capital reserves. The Basel II framework is more risk-specific and risk-sensitive than its predecessor Basel I that includes [1] operational risk in risk capital calculations, and [2] aligns provision of capital across all the aspects of business to risk measurement and management activities.

Basel II is built on three mutually reinforcing pillars (Caldwell, 2010:62):

- **Pillar 1** – consists of regulatory capital calculations related to credit. Market and operational risks, alignment of minimum capital requirements more closely to each bank's individual risk of economic loss.
- **Pillar 2** – relates the supervisory aspects relating to the institution's activities and risk profile in order to identify the adequacy of its capital and internal assessment processes, and to increase regulatory capital that will lead to corrective actions if weaknesses are identified.
- **Pillar 3** – describes how to improve the market discipline and to increase the transparency through specific public disclosure and reporting requirements to facilitate safe and sound banking practices.

Continuous regulatory compliance and increasing investor demands call for an enterprise view of risk with the following key driving forces (Caldwell, 2010:64):

- Trustworthiness in the management activities of financial institutions from the shareholders' perspective has dropped to an unacceptable level.
- Reviewing of corporate governance by developed countries – especially the role of non-executive directors as it relates to levels of risk tolerance and risk-based compensation.
- Increased requirements for regulators in improving the application of rules and principles to make risk more transparent.

2.6.2.4.2 Applicability to the organisation

Additional consultative documents have been issued by the Basel Committee of Banking Supervision to strengthen the regulation and supervision of the international active banks that include more precise supervision and risk management in (Anon, 2009:102):

- Risk concentrations.
- Off-balance sheet exposures.
- Securitisations.
- Related reputation risks.

Although the success of Basel II implementations can be questioned, Caldwell (2010:63) argues that the Basel II framework itself did not fail. From a regulatory perspective, it failed in the detection or mitigation of deficient risk management practices or policy violations. The institution itself also lacked the visibility into and the active management of risk processes that resulted in unsound decision-making and excessive risk-taking.

In general, banks that emphasise risk management components will be in a better position to [1] comply with regulatory directives, [2] improve performance, and to [3] increase customer satisfaction and market competitiveness (Caldwell, 2010:64).

2.6.2.4.3 Recommended action plans

The Basel Committee is continuously looking for areas to advance the framework as the implementation and interpretation by local regulatory authority jurisdictions vary, and adaptation of Basel II by central banks around the globe has been contradictory in terms of timing and what aspects of Basel II must be adapted (Caldwell, 2010:62).

Risk practices like [1] risk methodology, [2] data management, and [3] reporting promoted by Basel II should be incorporated and embraced by all institutions as it adds competitive value of effective governance but great care should be taken not to depend on regulators alone to intervene quickly enough to mitigate the impact of risk

events as this responsibility lies purely on the institution's management (Caldwell, 2010:63).

The ever-improving risk management practices in the banking sector along with international guiding frameworks like Basel II will eventually result in stronger financial markets that add value to all involved. Many aspects of Basel II remain controversial but there are no doubts that the risk management issues raised during the regulatory reform process, as well as the rules themselves, will prove hugely influential throughout the risk management industry for years to come (Crouhy *et al.*, 2006:55).

2.6.2.5 SOX

2.6.2.5.1 *The SOX construct*

Corporate scandals such as WorldCom and Enron promoted the establishment of the Public Company Accounting Reform and Investors Act of 2002, commonly referred to as the Sarbanes-Oxley Act (SOX). The Securities and Exchange Commission (SEC) is largely accountable for writing the SOX regulations. SOX also required the development of the Public Company Accounting Oversight Board (PCAOB) that lay out the standards for external auditing firms. PCAOB released a series of auditing standards in May 2004 such as Audit Standard no. 2 which made the IT systems area the SOX audit responsibility (Caldwell, 2010:52).

Due to the short SOX audit implementation grace period of November 2004, the process resulted in millions of dollars spent on consultation, process development, and implementation of automation control software. Industries and government want a refinement or rather relaxation in the control procedures enforced by SOX although a reduced compliance cost have been identified in 2007 (Caldwell, 2010:52).

SOX is becoming redundant in that compliance require duplication of work along with its costly and time consuming nature (Garneau, 2009:286). Although the banking industry is one of the most regulated industries, executives describe SOX as 'burdensome' - imposing additional burdens on the industry.

It is suggested that more thorough impact analysis research must be conducted by the regulators to reduce overlapping regulations in future enhancements of SOX (Garneau, 2009:293).

2.6.2.5.2 Applicability to the organisation

SOX enables businesses to invest in technologies that reduce the complexity and cost of compliance like enterprise governance, risk and compliance that all promote a single view of the truth by means of single repository implementations for documentation of policies. Many other companies also invested in IT security and IT operational control solutions but management must refrain from simply buying software to impress auditors; this will only lead to a waste of money. They must rather strive for tangible improvements in business performance (Caldwell, 2010:52).

Although the initial cost of implementing SOX will be high, subsequent years of compliance will allow for cost decrease as efficient and effective methods are learned and problems are solved from the steep learning curve (Garneau, 2009:292).

2.6.2.5.2 Recommended action plans

Implementations of SOX can be costly but many businesses report positive financial and IT process improvements. However, organisations must note that consultation costs may not be minimised once SOX is implemented, as some companies are still paying the SOX auditors long after project completion (Caldwell, 2010:53).

SOX is seen by Chief Financial Officers (CFOs) as a good thing that went too far. The process change can be soaring where little or no processes discipline existed prior to the SOX implementation along with enormous IT and financial impact. However, the regulators' new focal point on risk management is a step in the right direction that will enable well-oiled companies to reap business performance benefits from their SOX investments (Caldwell, 2010:53).

From the previous literature conducted it is clear that management can use ISO standards in conjunction with various management tools. Because of the enormous

amount of ISO standards that are available today, and the limited scope of the study, the ISO 31000 standard (risk management standard), will now be briefly discussed.

2.6.2.6 ISO 31000

2.6.2.6.1 The ISO 31000 construct

The International Organisation for Standardization (ISO) 31000 risk management is a generic standard largely based on its predecessor, the Australian/New Zealand Standard (AS/NZS) 4360, which was developed by Standards Australia and implemented successfully for the establishment of business goal oriented risk management programs across a variety of industries and public sector entities. ISO 31000 focuses on operational risk management that can be applied to manage a broad spectrum of risks, including financial-, IT-and operations-related risks, as a stand-alone risk management initiative or as part of an overall ERM program (Caldwell, 2010:27).

ISO 31000 is a methodology with practical steps to implement effective risk management that (Caldwell, 2010:27):

- Outlines the elements of a risk management plan.
- Identify the functions of a risk management information system.

2.6.2.6.2 Applicability to the organisation

Due to the increased regulatory pressure on organisations as perceived by executives, they view risk management as a strategic discipline for improving the overall business performance and to find a framework that can be quickly understood and readily implemented. ISO 31000 can be an effective tool in assisting management in the standardisation of risk management terminology along with the improvement in communication of risks and to coordinate risk management across the entire organisation (Caldwell, 2010:27).

2.6.2.6.3 Recommended action plans

If companies value the establishment of effective risk management programs, not just for the sake of compliance, along with aligned strategic business goals and objectives, ISO 31000 will be truly transformational (Caldwell, 2010:27).

2.7 SUMMARY

Organisations are relentlessly trying to wring improved performance from their daily business operations in order to sustain competitive advantage. The business processes that make up these operations must be aligned with the overall organisational strategy along with governance thereof. New or existing IT projects will enable a path of growth and long-term ROI. However, embarking on such large-scale investments leave little opportunity to turn back, and sound project management will be required to effectively manage unforeseen issues during the project lifecycle, and if they fail, the organisations will be constantly functioning in crisis mode.

The absence of risk control and risk management can be destructive towards the overall business performance. IT risk is mainly due to the accelerated technological pace of change and for any risk program to be successful, sound risk-based decision-making is crucial. Management skills are of paramount importance to reduce direct cost of projects and to handle these increased challenges derived from improvements on existing IT infrastructures. There is also a need for a robust risk management framework although many industry standard methodologies exist to assist management in this task of project delivery.

Shareholders require transparency and high standards of corporate governance that must therefore function in an environment that cultivate open communication channels. Organisations must further develop and implement plans to evaluate and improve the effectiveness of risk management. These methods will enable top management to obtain reasons behind project failures and also to reduce future risks.

The shareholder value will be delivered by means of information that is applied through effective knowledge management initiatives. Measurable strategic objectives must be constantly reviewed and communicated to shareholders.

Project managers use standard approaches to plan and control projects that include strategic alignment; establishment of relationships; resource allocation; stage monitoring; guidance in roles and responsibilities; and effective risk management due to unavoidable change. Well oiled project planning and execution still require the identification, relationship with and management of project stakeholders in order to be successful. Although projects will be a temporary endeavour, constant monitoring and evaluation will be required to measure the overall business performance.

Management tools like Prince2 and PMBOK can guide the project management process. Prince2 can be applied to various project types whereas PMBOK focuses more on individual projects. None of them, however, ensure project success and the project team must decide on the combination of each tool to implement according to the individual organisational needs.

Proactive risk management can be seen as a scientific soul mate to project management. The IT risk management process consists of the [1] definition of a risk policy and standards; [2] identification and assessment of risks; [3] prioritising risks and assigning responsibility; [4] addressing risk; and [5] monitoring and tracking risk. Communication lies at the heart of effective risk management that establishes critical links between shareholders' needs; information distribution; performance reporting; and management of issues towards shareholders. Business Continuity Management must be further performed to ensure that critical business functions will be available in case of failure.

From an IT governance perspective, top management involvement as an essential risk factor must be attained with each new project intervention along with the required sponsor support. IT projects must be seen as an essential asset to add value to organisations. Knowledge management must be applied throughout the organisation that must in turn cultivate open communication channels. Challenges exist in

documenting and sharing this knowledge by means of support systems or tacit transfer methods.

Governance, as the binding glue for organisations, has been one of the fastest growing elements of risk management. The Companies Act of South Africa (71/2008) requires the directors to implement and monitor governance models to assist management in the risk process, but no definite model is prescribed as the best or most effective in order to comply. IT governance will assure value for stakeholders; strategic alignment with business objectives; value delivery; resource management and the effective management of IT risk. Performance measurement is paramount to IT governance and must be set and monitored by measurable objectives. Governance tools like COBIT, ITIL, King III report, Basel II, SOX and various ISO standards are available to guide management.

COBIT as a comprehensive framework for IT management, promotes an excellent reference model to advance IT governance. ITIL is complementary rather than competitive towards COBIT, although ITIL would probably be more suited for continuous improvement of IT operations efficiency and customer quality. King III as non-legislated code towards JSE Securities Exchange, states that a company should have a risk assessment framework in place to enable management to pro-actively and continuously address risks. King III is more focussed on risk management than its predecessors and provides for valuable principles towards the governance process. Basel II has reached the plateau but its effectiveness purely rests on the management of financial institutions to extend beyond the regulation alone. SOX implementation can be costly which may lead to enormous IT and financial impact. However, the new focal point on risk management will allow companies to reap performance benefits from their SOX investments. Various ISO standards can be used in conjunction with these management tools like the ISO 31000 risk management standard to guide in effective implementation of risk practices.

Independent of the strategy layout followed by an organisation, risk will be unavoidable and will require effective project risk management practices throughout the project cycle. Risk management phases will include the [1] strategy and plan; [2]

assessment of the current state; [3] implementation of project plan; and [4] adjustment and evolvement of risk operations according to new business needs.

All of the above must therefore be incorporated into the overall business strategy as the execution and alignment thereof is a reliable recipe to test for managerial excellence.

The literature indicated a vast variety of key factors within the large academic practice field of project risk management. These factors further assisted in a holistic approach towards the proposal of a general project risk management framework.

The investigation and results are discussed in the next chapter.

CHAPTER 3

EMPIRICAL STUDY

3.1 INTRODUCTION

The rationale of the empirical research is to align the primary and secondary objectives of the study, as discussed in chapter one. Empirical research was done using an electronic survey distributed via e-mail to participants in the survey. The chapter starts with an overview of the structuring of the questionnaire, moving on to an overview of the data gathering method, ending with the results of the survey. The latter includes various aspects such as: profile of the respondents; general project management; information audit and strategy; governance; knowledge management; organisational support systems, communication channels; roles and responsibilities, management of risk; and framework evaluations. The chapter concludes with the evaluation of the components based on the results from the empirical research.

3.2 STRUCTURING OF QUESTIONNAIRE

The questionnaire was designed to assess the perceptions of respondents regarding the risk management components organisations need to consider in the project management life cycle. The purpose was to rank the perceptions of the components. These components were then used in combination with the components identified in chapter one and two of this study.

3.1.1 Questionnaire sections

The project risk management questionnaire was divided into the following sections:

3.1.1.1 Section A

Section A's purpose was to obtain specific information regarding the demographic information of the respondents to the questionnaires. Information such as age, gender, job title, highest qualification and years working for the specific organisation was collected.

3.1.1.2 Section B

The purpose of section B was to attain specific information pertaining to the organisation the respondent works for that includes the industry type, size of the organisation, as well as to when they plan to upgrade their internal information systems.

3.1.1.3 Section C

In section C information pertaining to project risk management was obtained. The section covered the following aspects: general project management, information audit and strategy, governance, knowledge management, organisational support systems, communication channels, roles and responsibilities, management of risk, and framework/methodology evaluation.

Table 3.1 shows the amount of questions per section. The questionnaire also contains sub questions within these main question sections.

Table 3.1: Total number of questions per section

SECTION	NUMBER OF QUESTIONS
A	5
B	3
C	31
TOTAL SURVEY	39

3.1.2 Basis of design

The questionnaire was designed using the following methodology:

- Establishment of the objectives of the study, and using this to label the research objectives of the study.

- Determining what questions needed to be asked to obtain the required information that was necessary to answer the research objectives of the study.
 - Objectives were transformed into the information that was needed from the questionnaire.
 - Questions were developed to get the required information that was needed to attain the research objectives.
- An interactive portable document format (PDF) questionnaire form was developed within Adobe Acrobat Pro 9™ for distribution. This added an advantage in that the format prevented common typing errors as well as enforcing the completion of all questions according to the required rule sets.
- Questions were sorted to move from general type questions to more specific questions.
- The following data types were used in the questionnaire (Steyn, Smit, Du Toit & Strasheim, 2000:7; Levine, Stephan, Krehbiel & Berenson, 2008:8; Brace, 2004:75):

Categorical data

- *Ordinal data: Ranking scales to determine the satisfaction levels of variables.*
 - *Nominal data: Classification of data into distinct categories with no ranking.*
- The Likert scale (also known as the 'agree-disagree' scale) was used with the majority of the questions. In respect of each statement, respondents had to indicate their degree of agreement or disagreement. It also has advantages, for the electronic PDF format of the questionnaire, as this technique is painless to administer in self completion questionnaires in either paper or electronic format (Brace, 2004:86).

Annexure A contains a printer friendly version of the questionnaire.

3.2 GATHERING OF DATA

3.2.1 Research process

Overall, 312 companies were identified using the following publications: Best Employers South Africa, 2010/11; and Top 300 Profiles, 2008/9/10/11. These companies form the study population.

Some of these companies were contacted and informed of the purpose of the survey. Permission was then asked to send the survey via-email and whether the person would be willing to distribute the survey within his or her organisation. The target staff audience level was targeted at middle- and top management. The selected organisation population consisted mainly of large turnover per annum ratios. A convenience sample approach was conducted on the study population which resulted in 61 organisations. Emails were sent out to 52 organisations out of the 312 original organisations.

An additional nine e-mails were sent out to companies identified using different methods than stated above. These methods included manual delivery to organisations – without the interactive PDF ability. Participants were informed of the purpose of the survey, ethical considerations, basis of selection and instructions for questionnaire completion. To increase participation levels, anonymity was assured.

Annexure C contains the original electronic mail message sent out to the organisations.

3.2.2 Data collection

A total of 46 valid responses were collected from the population of 61 organisations who received the questionnaire. They formed the sample of this study. The reasons for the response rate can be that the respondent:

- Decided that he was not capable of completing the questionnaire.

- Had limited time or other work related deadlines that required a higher priority.
- Experienced technical issues with populating the document in PDF format – no PDF reader software, corporate firewall restrictions, and more.

3.2.3 Data analysis

Analysis was done on the data received from the valid responses thus the following section will cover these responses in more detail.

3.3 RESULTS AND DISCUSSION

The statistical analysis was carried out with the help of SPSS (SPSS Inc., 2009); SAS (SAS Institute Inc., 2003), and STATISTICA data analysis software (StatSoft Inc., 2009) by the North-West University's Statistical Consultation Services.

In the analysis of the data the following test was conducted in specific instances of analysis:

- General descriptive statistics.
- Spearman's rank order correlation coefficient.

This measure is used as a measurement of the strength of association or correlation between two sets of data and is calculated by (Steyn *et al.*, 2000:615):

$$r_s = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

Where: n is the number of ranks and d the difference in the statistical rank of corresponding variables.

Spearman's rank order correlation coefficient is nonparametric in the sense that it does not rely on assumptions such as normality and is therefore used in this study (Field, 2009:179).

Table 3.2: Spearman's correlation and p-value evaluation

SPEARMAN'S VALUE	INTERPRETATION
0.1	Small: No practically significant correlation.
0.3	Medium. Practically visible correlation.
0.5	Large: Practically significant correlation.
p-value	INTERPRETATION
< 0.05	Correlation is statistically significantly not equal to zero.

Source: Adapted from Field (2009:179)

- **T-tests:** calculated on ordinal data grouped by a nominal variable with two categories.

From the sample the statistical significance tests (e.g. t-tests) can be used to show that the result (for instance, the difference between two means) is significant. The p-value is a criterion of this, giving the probability that the obtained value could be obtained under the assumption that the null hypothesis (for instance, there is no difference between the population means) is true. A small p-value (for instance, if it is smaller than 0.05) is considered as sufficient evidence that the result is statistically significant. However, the statistical significance does not necessarily imply that the result is important in practice as these tests have a tendency to yield small p-values (indicating significance) as the sizes of the data sets increase (Ellis & Steyn, 2003:51). Effect sizes can be used to determine if the results are important in practice.

Table 3.3 indicates how the effect size (Cohen's d-value) can be interpreted.

Table 3.3: Cohen's effect size interpretation

d VALUE	EFFECT	PRACTICAL SIGNIFICANT LEVEL
0.2	small	Not practically significant.
0.5	medium	Practically visible.
0.8	large	Practically significant.

- **Cross-tabulations and Pearson's Chi-Square Test:** calculated on nominal data.

To determine if a relationship (dependency) exists between two nominal variables and if the relationship is practically significant. The Chi-square (χ^2) test can be used to determine if such a relationship is large enough to be statistically significant (Ellis & Steyn, 2003:53). To determine if such a relationship is practically significant, the effect size calculated:

$$w = \sqrt{\frac{\chi^2}{n}}$$

Where:

n is the sample size. If both nominal variables have only two categories, w is given by the phi (ϕ) coefficient.

Table 3.4 Phi value interpretation

PHI VALUE	PRACTICAL SIGNIFICANT LEVEL
0.1	Small effect or no practically significant dependency.
0.3	Medium effect or practically visible dependency.
0.5	Large effect or practical significant dependency.
p-value	EFFECT
< 0.05	Statistically important dependency

Note: An option for "Unsure" was also included for some of the questions in the questionnaire. For some of the analyses, "Unsure" responses were not included in the analysis. The "Missing" values indicate that the corresponding question was not

answered by one or more participants. Missing values were not considered in the calculation of statistics.

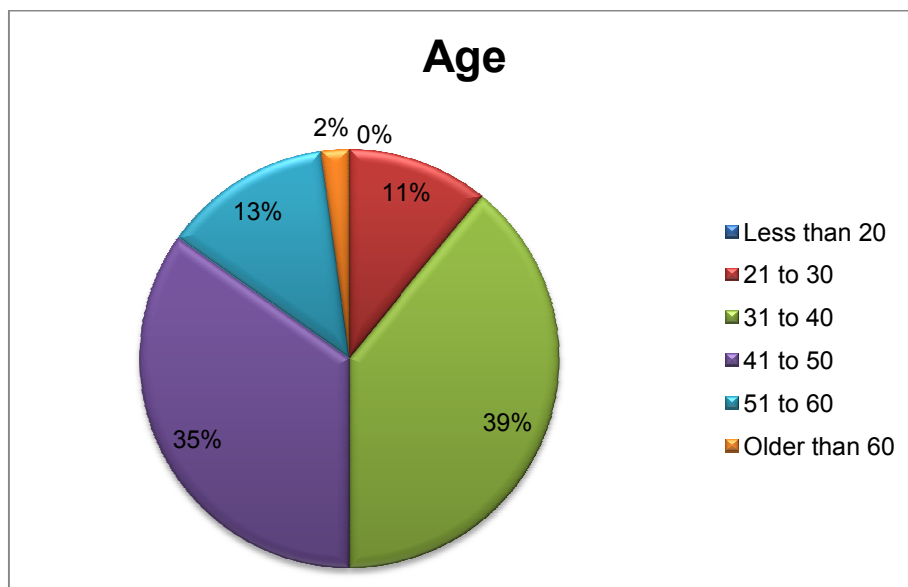
QX illustrate question numbers e.g. Q9 indicate question number 9.

3.3.1 The profile of the respondent

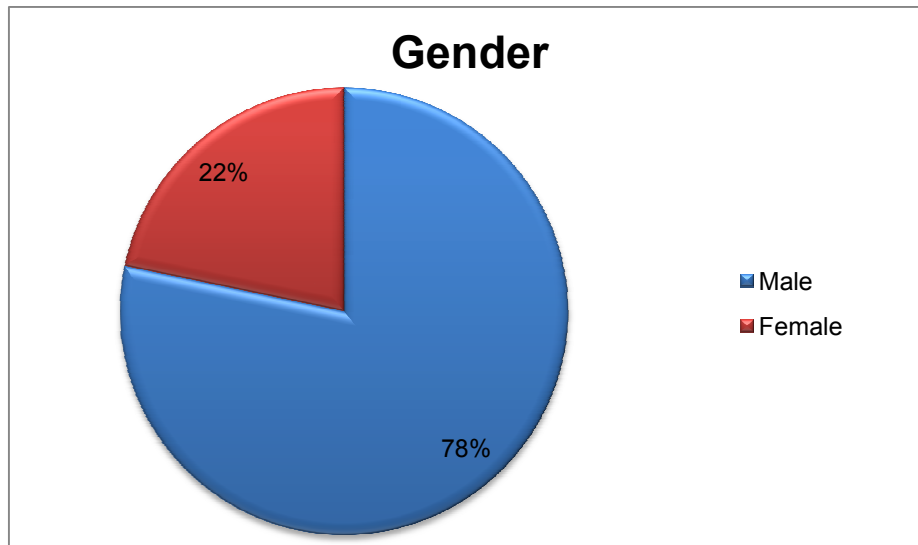
Demographic information

From the results as indicated in graphs, graph 3.1 to 3.5, the categories of the various demographical items that had the highest frequencies were respectively males; aged between 31 to 50 years; fulfilling the position as a manager; with a university degree; and working for the company for less than 5 years.

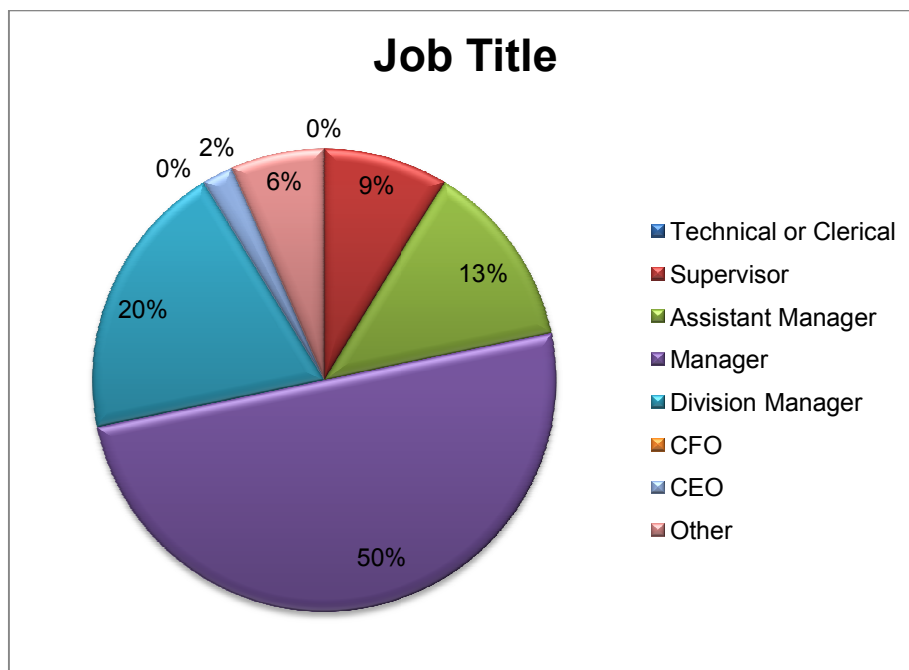
Graph 3.1: Age of the respondents



Graph 3.2: Gender of the respondents



Graph 3.3: Job title of the respondents

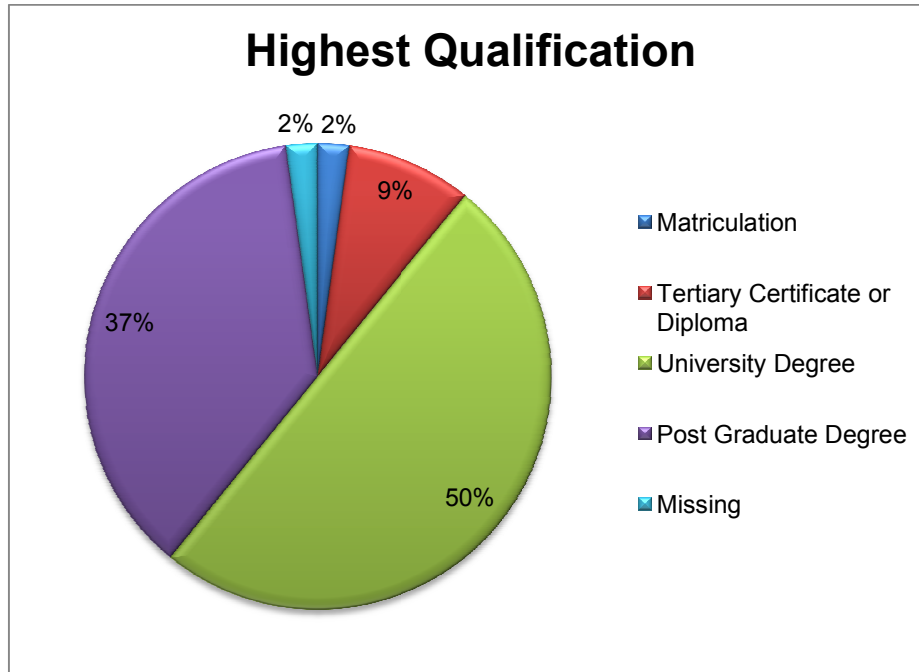


From graph 3.3, 6% of the respondents indicated “Other” for the job title and consisted of the following information:

- Business analyst.

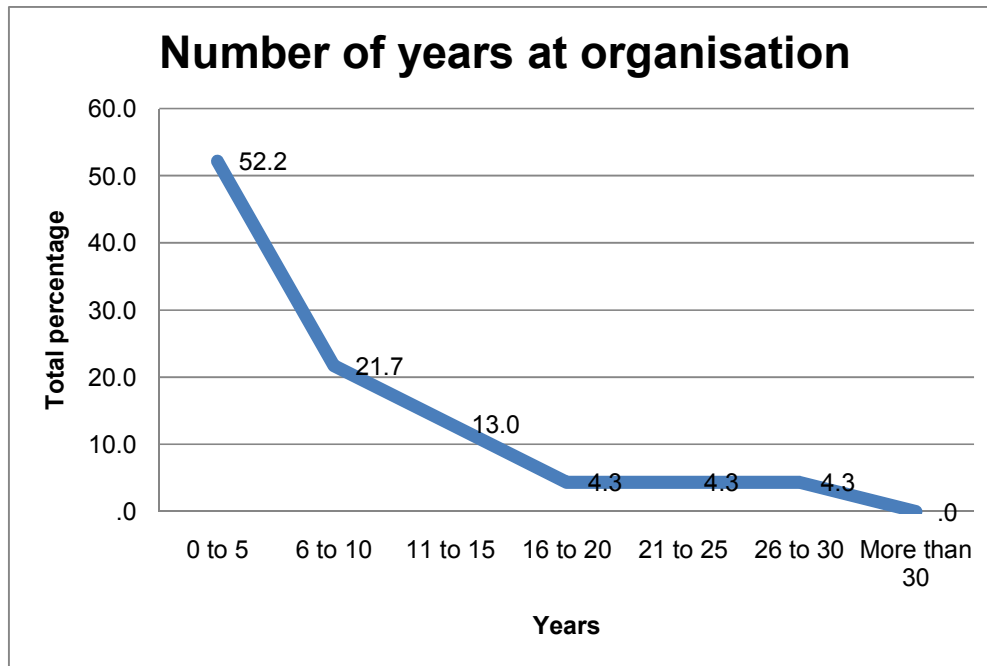
- Project manager.
- Senior project manager/business consultant.

Graph 3.4: Highest qualification obtained of the respondents



From the results as indicated in graph 3.4, 2% of the respondents failed to complete the question.

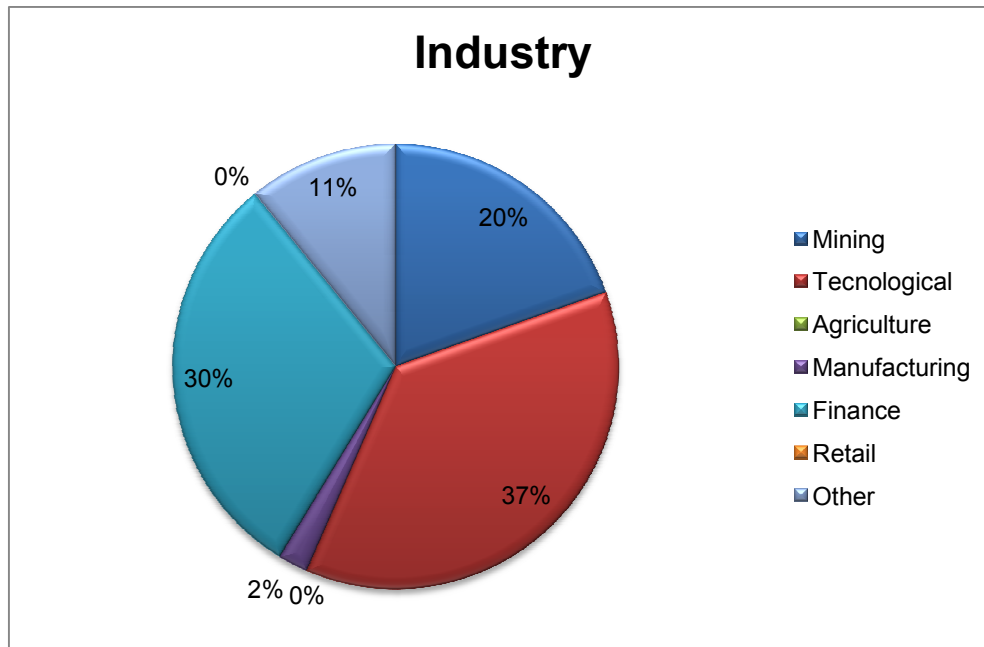
Graph 3.5: Number of years working for organisation



Information about the participants' organisation

The profiled respondents' organisations are mainly in the Mining, Technological, and Financial industries; having an average turnover above 200 million rand per annum; and planning to upgrade their existing IT systems within the next 3 years.

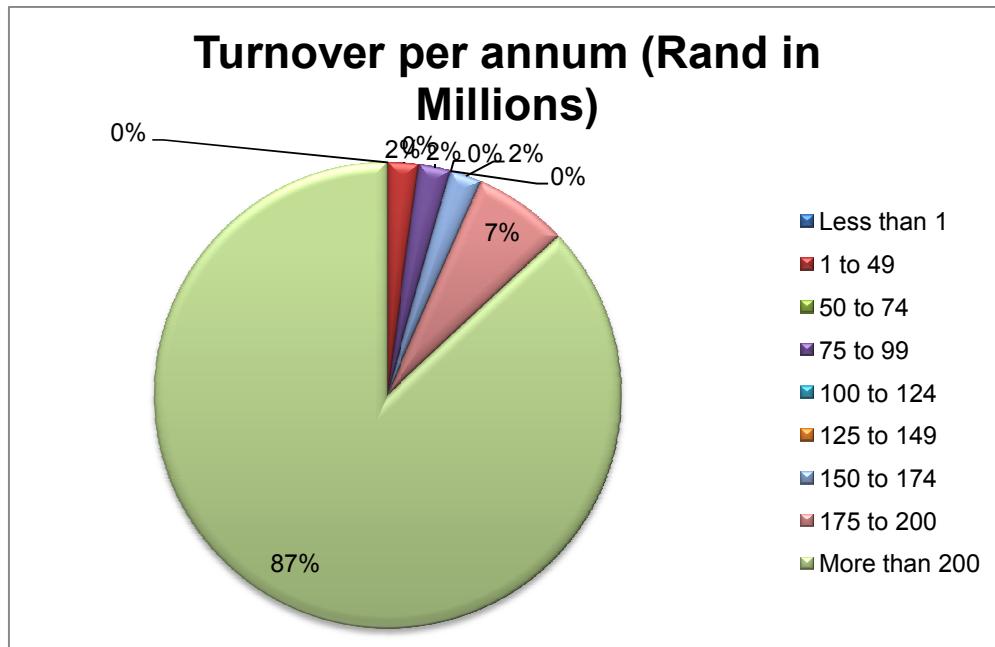
Graph 3.6: Industry of the organisation



From graph 3.6, 11% of the respondents indicated “Other” for the organisations’ industry that consisted of the following information:

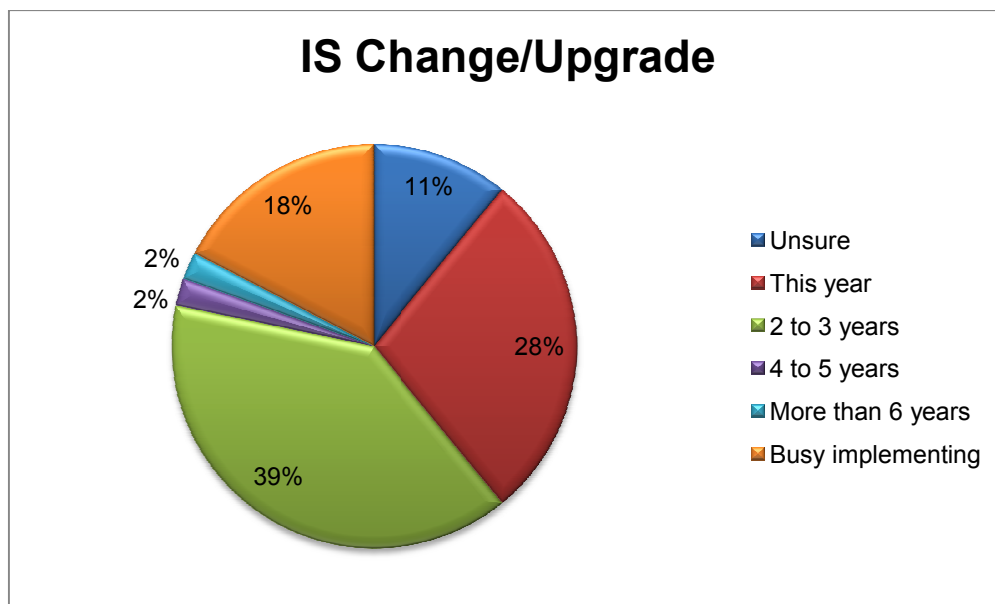
- Education.
- Higher Education.
- Information Technology.
- Local government.

Graph 3.7: Turnover per year of the organisation



The size of the organisations in the sample was more than 200 million rand per annum (see graph 3.7).

Graph 3.8: Planned change/upgrade of the IS of the organisation



A total of 84.8% of the respondents indicated that they are either busy implementing or will change/upgrade their information systems within the next three years. This indicates the importance of [1] not only staying in line with technological advances, [2] but also for organisations to position themselves in the market in order to gain competitive advantage. Management will therefore need all the required tools to assist them in this never ending changing environment of IM.

3.3.2 General project management

The general perception of the respondents regarding their organisations' general project management techniques will now be evaluated (see graph 3.9).

Initiation, execution and monitoring activities are all part of a general project management lifecycle along with the risk identification process. It is the management of issues and risks within this cycle that will determine the overall project's success. The perceptions on the management of critical issues and problems during *planning* are evaluated by 47.9% (Q11) of the respondents as being moderate to bad. They further showed negativity to the *execution* of these critical issues (Q12 - 47.8%) as laid out in Annexure B. 73.9% (Q9) of the respondents evaluated their projects' preliminary assessment and evaluation process as good with 65.2% (Q10) indicating a good to excellent rating for the design layouts of their projects. The organisational risk assessment further indicates an upbeat towards their project management practises (Q13 - 58.6%).

Table 3.5 Spearman's correlation – General project management

Question 11 and question 12.		How would you rate the management of critical issues and problems encountered during project planning?	How would you rate the management of critical issues and problems encountered during project execution?
How would you rate the management of critical issues and problems encountered during project planning?	Correlation Coefficient	1.000	.642**
	p-value	.	<0.0001
	N	45	45
How would you rate the management of critical issues and problems encountered during project execution?	Correlation Coefficient	.642**	1.000
	p-value	<0.0001	.
	N	45	45
Question 12 and question 13.		How would you rate the management of critical issues and problems encountered during project execution?	How would you rate the risk assessment/evaluation process during the project management life cycle?
How would you rate the management of critical issues and problems encountered during project execution?	Correlation Coefficient	1.000	.536**
	p-value	.	<0.0001
	N	45	45
How would you rate the risk assessment/evaluation process during the project management life cycle?	Correlation Coefficient	.536**	1.000
	p-value	<0.0001	.
	N	45	46

** . Correlation is significant at the 0.01 level (2-tailed).

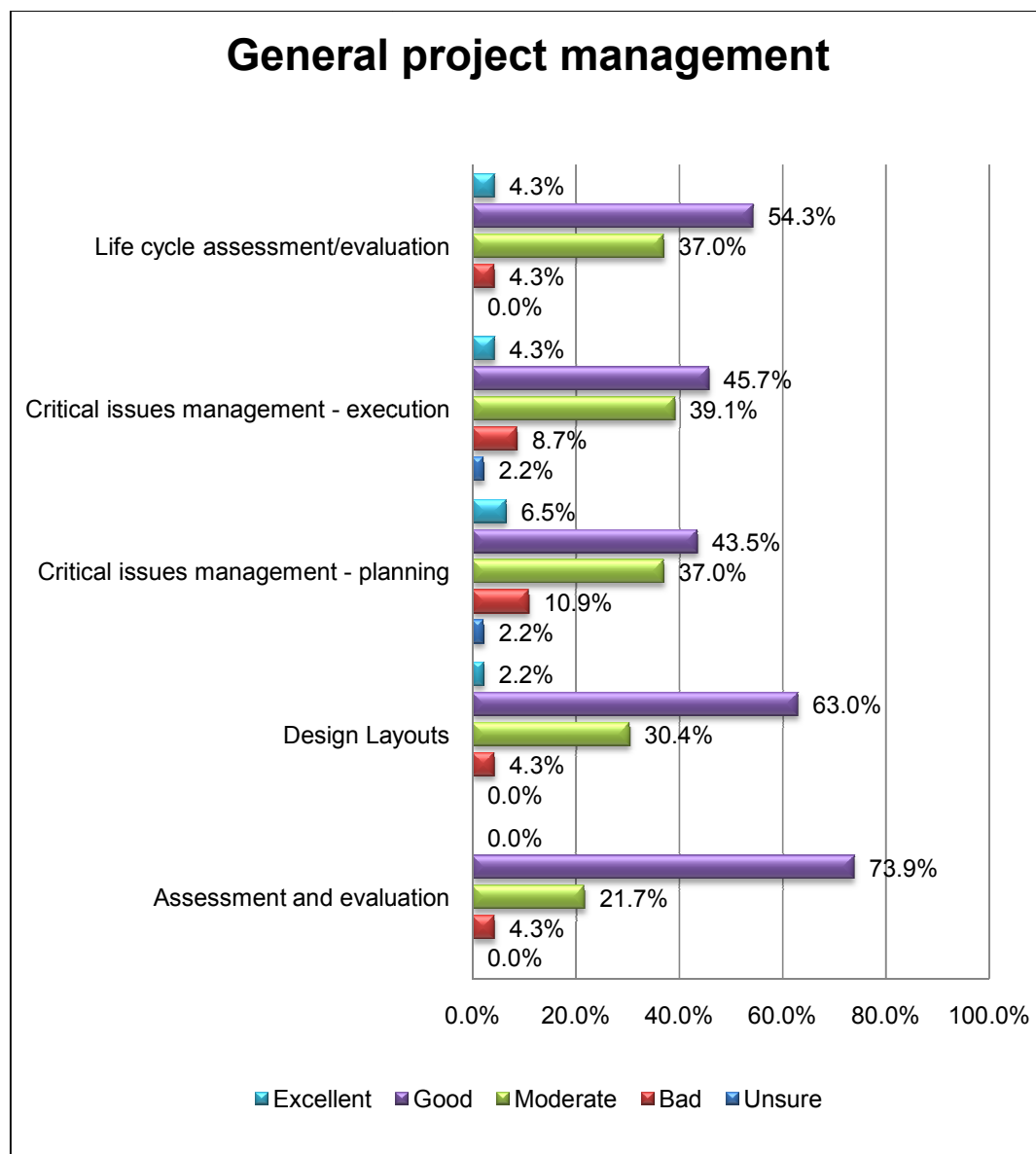
Table 3.5 indicates a large practical significant correlation (0.642) between the management of critical issues and problems encountered during project planning and also the execution thereof (Question 11 and 12). The p-value is also much smaller than the level of significance of 0.05 which further indicates the statistical significant correlation between the two perceptions. The table further indicates a strong correlation between the project's execution and the overall risk assessment/evaluation during the project management lifecycle (Question 12 and 13).

The management of projects within the respondent's organisation seems to be experiencing problems in the complete project lifecycle (planning and execution) in conjunction with risk management elements.

Management applicability

It seems that the organisations' underlying project management deficiencies are focused preliminary on the execution and monitoring of identified risks rather than the identification or assessment thereof.

Graph 3.9: General project management perceptions



3.3.3 Information audit and strategy

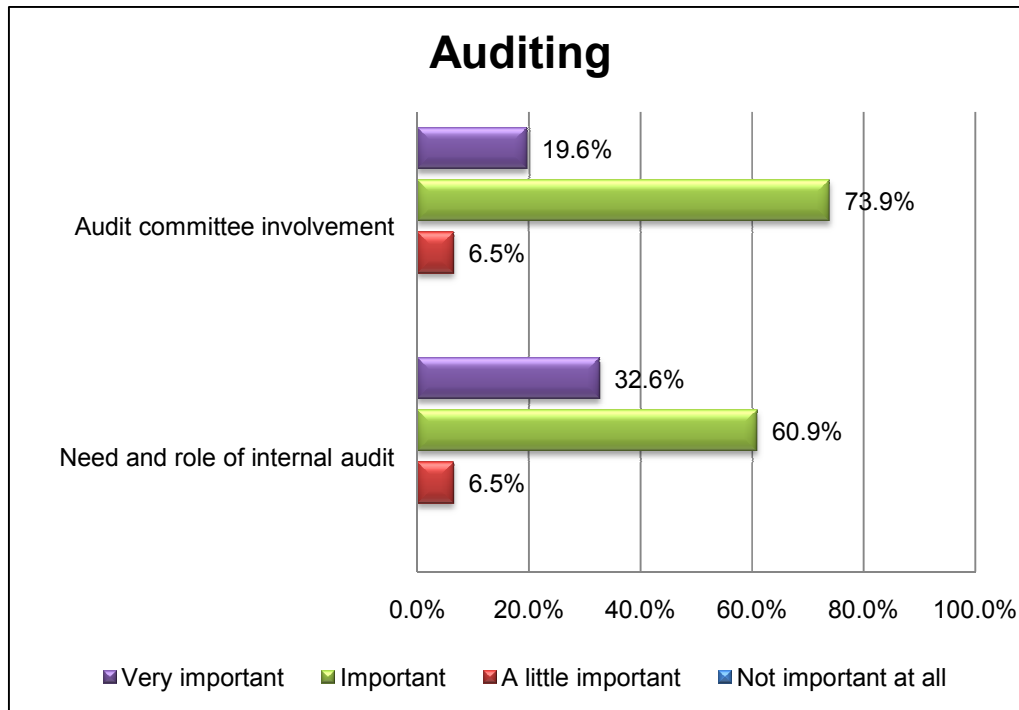
The general perception of the respondents regarding information audits and strategy will now be discussed.

The respondents either agreed or strongly agreed (91.3%) that information audits have a purpose to maximise the leverage of IS and technologies, thereby ensuring the strategic alignment with the overall goals and mission of an organisation. All of the respondents ranked the King III risk component: strategy, performance and sustainability as inseparable assets (see Annexure B).

Graph 3.10 indicates that the respondents (93.5%) ranked both the need and role of an internal audit and the involvement of an audit committee as important to very important.

It is worth noting that 64.7% (Q32) of respondents also perceived regulatory compliance as not adding too much additional pressure/overhead to their daily operations (see Annexure B).

Graph 3.10: Auditing from King III



Graph 3.11: Strategic alignment

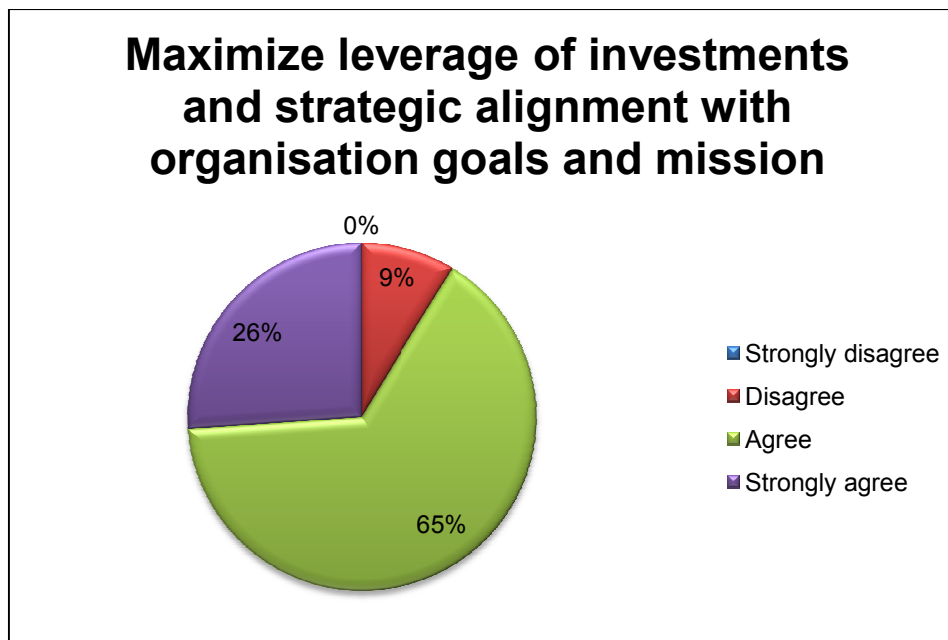


Table 3.6: Spearman's correlation – Audit and strategy

		The need and role of internal audit	Audit committee involvement
The need and role of internal audit	Correlation Coefficient	1.000	.637**
	p-value	.	<0.0001
	N	41	41
Audit committee involvement	Correlation Coefficient	.637**	1.000
	p-value	<0.0001	.
	N	41	41

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3.7 indicates a large practical significant correlation (0.637) between the need and role of an internal audit and the audit committee involvement. The p-value is also much smaller than the level of significance of 0.05 that further indicates the statistical significant correlation between the two perceptions. Respondents see the importance of an internal audit and agree with the statement that these audits must be executed along with the audit committee involvement.

Management applicability

It seems that the general respondents' perceptions on auditing are more positive towards the legislation and also more importantly, the need thereof that will further assist management in the strategic alignment (see graph 3.11) of critical information business processes, performance and risk.

3.3.4 Governance

The general perception of the respondents regarding governance will now be discussed.

Corporate governance within South Africa search within the King III report for guidance. The following regarding governance is laid out within the King III report and the findings are:

- All of the respondents ranked an important to very important score to the documented risk management policy plan that should be manifested by governance (see graph 3.12).
- All of them also ranked IT governance as important or very important.

The respondents further noted that risk methodology and data management add competitive value to the effectiveness of IT governance (Q20 - 95.6% either agreed or strongly agreed). From the conducted literature study, it was identified that an organisation needs a well-defined compliance program and as previously stated under the auditing section; the respondents showed positive perceptions towards regulatory compliance within an organisation.

Graph 3.12: Governance

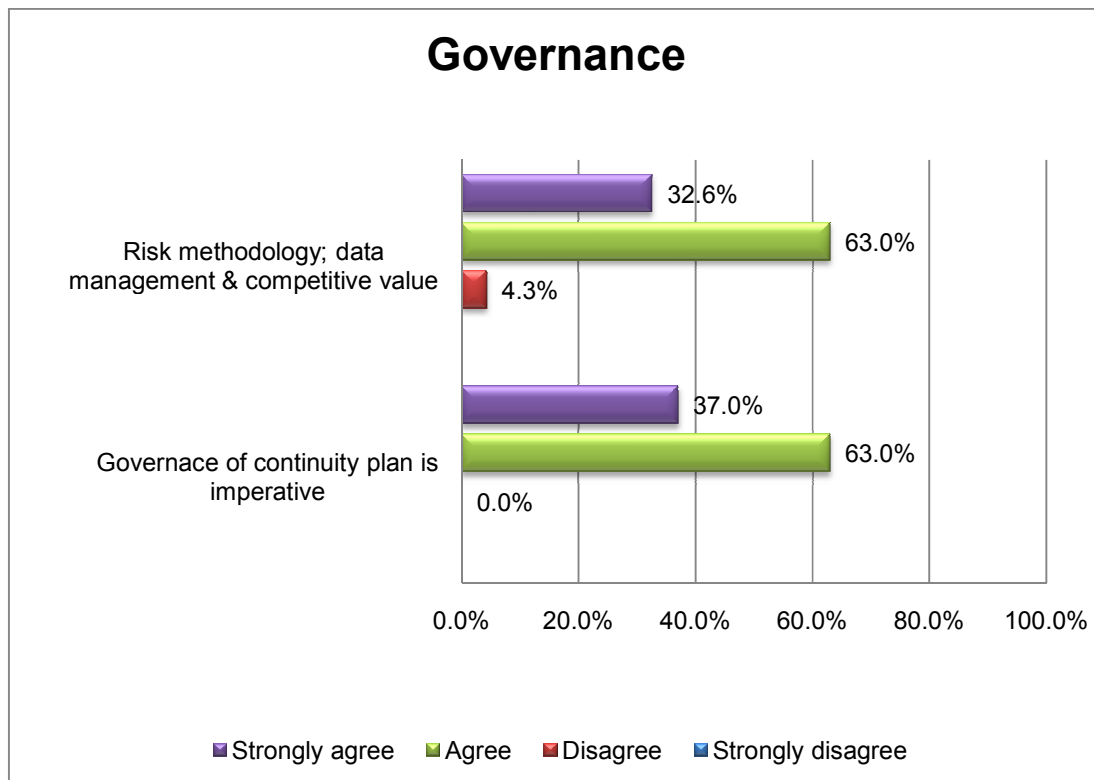


Table 3.7: Spearman's correlation - Governance

		The risk practices like risk methodology and data management add competitive value to effective IT governance.	IT governance
The risk practices like risk methodology and data management add competitive value to effective IT governance.	Correlation Coefficient	1.000	.325*
	p-value	.	.038
	N	41	41
IT governance	Correlation Coefficient	.325*	1.000
	p-value	.038	.
	N	41	41

*. Correlation is significant at the 0.05 level (2-tailed).

Table 3.8 indicates a noticeable practical visible correlation (0.325) between the importance of IT governance and risk practices like risk methodology and data management to add value to IT governance. The p-value is also much smaller than the level of significance level of 0.05 that further emphasizes the statistical significant correlation between the two perceptions. IT governance when seen as important can improve its competitive value with risk practices like risk methodology and data management.

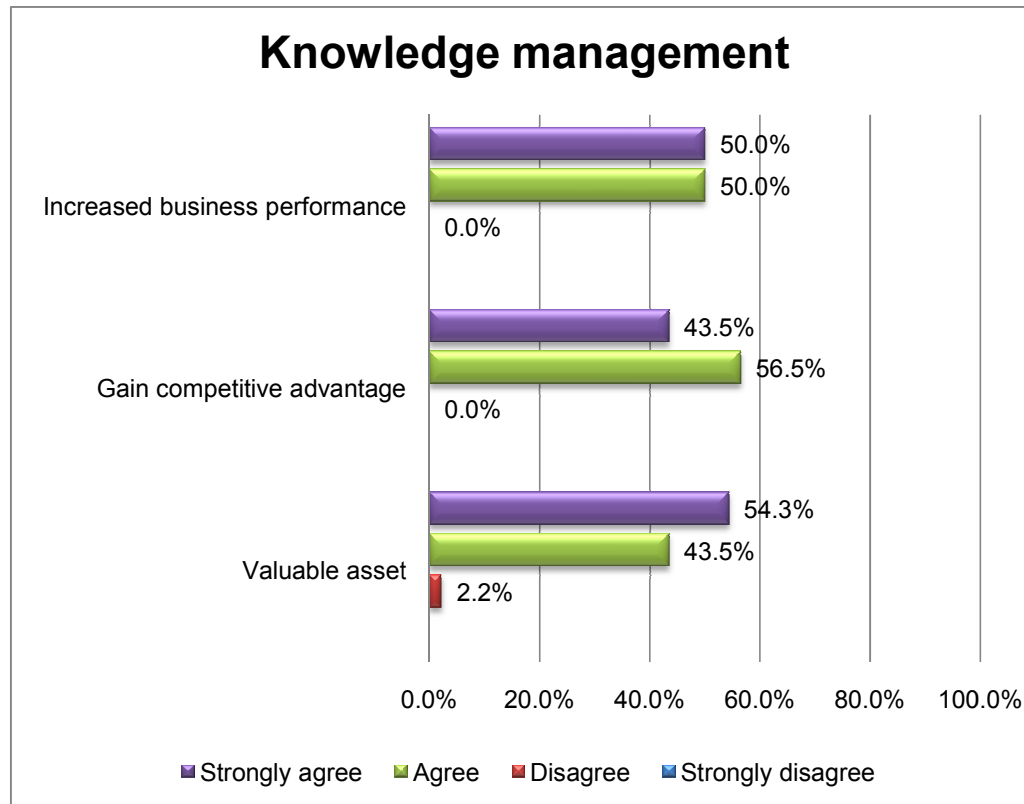
Management applicability

Within the South African environment, management is continuously seeking for a better market position by incorporating compliance related spending. Risk methodology and data management can add to this required competitive value by means of effective IT governance.

3.3.5 Knowledge management

The general perception of the respondents regarding knowledge management will now be discussed.

Graph 3.13: Knowledge management



Almost all of the respondents (Q15 - 97.8%) either agreed or strongly agreed that knowledge is a very valuable asset within their organisation. To further gain competitive advantage, a company must improve its business processes with effective business information knowledge. All of the respondents agreed or strongly agreed with the statement that the management of business information knowledge is useful to gain competitive advantage. The results from Q21 also support this in that all of the respondents agreed (50%) or strongly agreed (50%) with the statement that knowledge sharing is an effective tool to increase overall business performance.

In order to gain performance increase, management must put systems in place to collect and analyse information gained during/after projects that will further add value to the continual improvement process. 65.2% of the respondents have systems in place (Q29) with some of them indicating that they are not sure (10.9%). The next section will evaluate these supporting systems in more detail.

Table 3.8: Spearman's correlation – Knowledge management

		Knowledge is a very valuable asset in our organisation.	The sharing of knowledge increases the overall business performance.
Knowledge is a very valuable asset in our organisation.	Correlation Coefficient	1.000	.510**
	p-value	.	.001
	N	41	41
The sharing of knowledge increases the overall business performance.	Correlation Coefficient	.510**	1.000
	p-value	.001	.
	N	41	41

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3.9 indicates a strong practical significant correlation (0.510) between knowledge as valuable asset in an organisation, and the sharing of this knowledge in order to increase overall business performance. The p-value is also much smaller than the level of significance of 0.05 that further emphasizes the statistical significant correlation between the two perceptions. Therefore, knowledge that is seen as a valuable asset will increase overall business performance if it is shared within an organisation.

Management applicability

Knowledge management as a combination of strategies, techniques and tools for capturing and sharing knowledge, will lead management towards better competitive positions as well as boosting the overall organisation's performance. The risks identified during previously executed projects must be well documented and shared in order to learn, grow and reduce/eliminate future risks and issues.

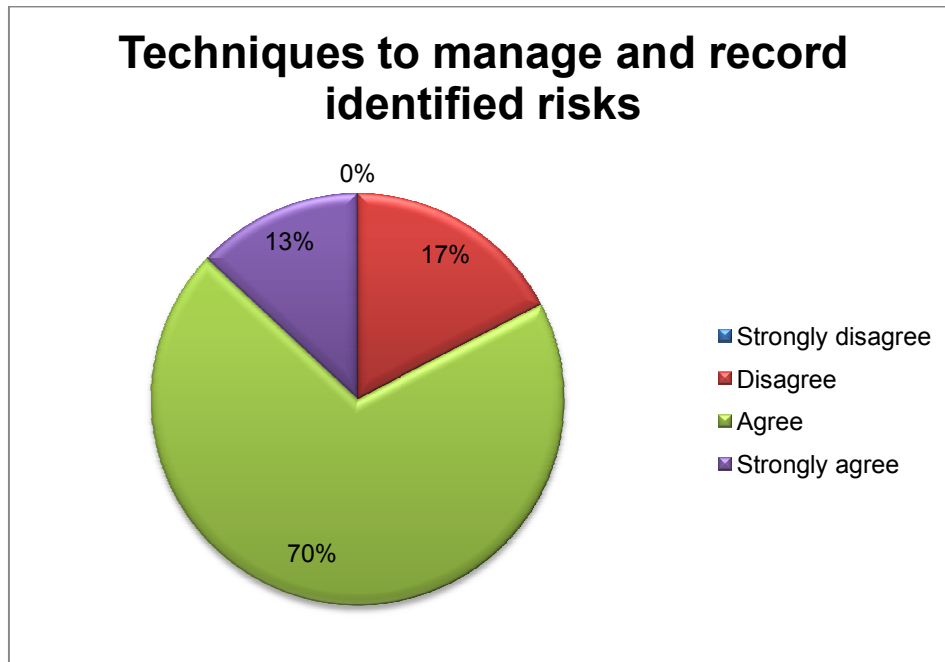
3.3.6 Organisational support systems

The following relating to risk and information support systems will now be evaluated.

Graph 3.14 indicates that 83% of the respondents' organisations have some sort of techniques or processes in place to prioritise, manage and record identified risks and its corresponding resolutions. They further noted that a system has been put in

operation to collect and analyse gained information from projects that is used in the continuous improvement process (Q29 - 65.2%). Distressing is the fact that there are some organisations that do not have any support system in place (23.9%).

Graph 3.14: Techniques to manage identified risks



Graph 3.15: Project information support system

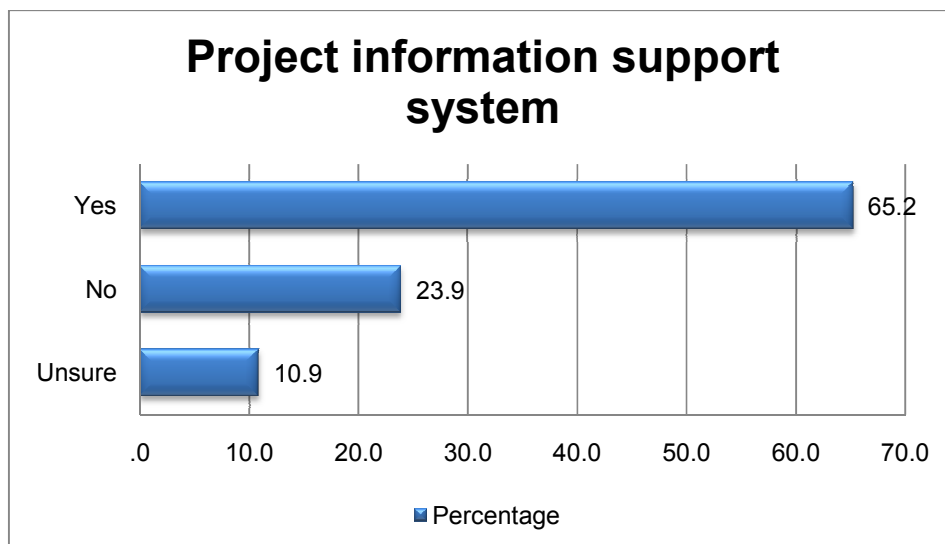


Table 3.9: T-test – System support

	Has a system been put in place to collect and analyse the information gained during/ after projects for use in a continual improvement process?	N	Mean	Std. Deviation	Cohen's d-value	t	p-value
Techniques are being used in the projects to prioritise, manage and record the identified risks and its resolutions.	No	11	2.45	.522	1.364	-3.988	.001
	Yes	30	3.17	.461			

A strong Cohen's d-value (1.364) indicates a value that is way above 0.8, thereby signifying a large effect on the strong practical significant difference as perceived by the respondents. The p-value of 0.001 also supports the statistical significant difference evaluated above (see table 3.10).

This clearly indicates the relation between the [1] required techniques that need to be in place to record risks and its resolutions, and [2] the need for a support system to analyse information gained during projects. The respondents, who are agreeing with the importance of techniques to prioritise, manage and record identified risk and resolutions, also indicate that their organisation has a system in place to analyse the results of such information in order to add value to the continuous improvement process.

Management applicability

Support systems are closely coupled to IM as it provides a repository for critical business information. Together with effective KM, these systems can enhance the decision-making process, evaluation process of risks, and the overall project execution to name a few. These repositories will guide management in the issues and risks identified from previous endeavours that will ultimately add value to the overall effectiveness of future and current project executions.

Identified risks must be quickly and effectively escalated; these escalations, however, will only be possible within an organisation that supports open communication channels.

3.3.7 Communication channels

The general perception of the respondents regarding project communication levels will now be discussed.

76.1% of the respondents indicated that they are operating in an environment that supports open communication channels (see graph 3.16). These channels assist teams to escalate and assess identified project risks and issues. The rest of the respondents, however, feel that their project organisational structures prohibit them in their communication and co-operation between other project participants. The latter implications may lead to the following:

- Project scope creep.
- Increased project execution time – increased overall project cost.
- Resources limitations due to overloaded task allocation of delayed identified problem areas.
- Ultimately slipping on deadlines.

Graph 3.16: Communication support

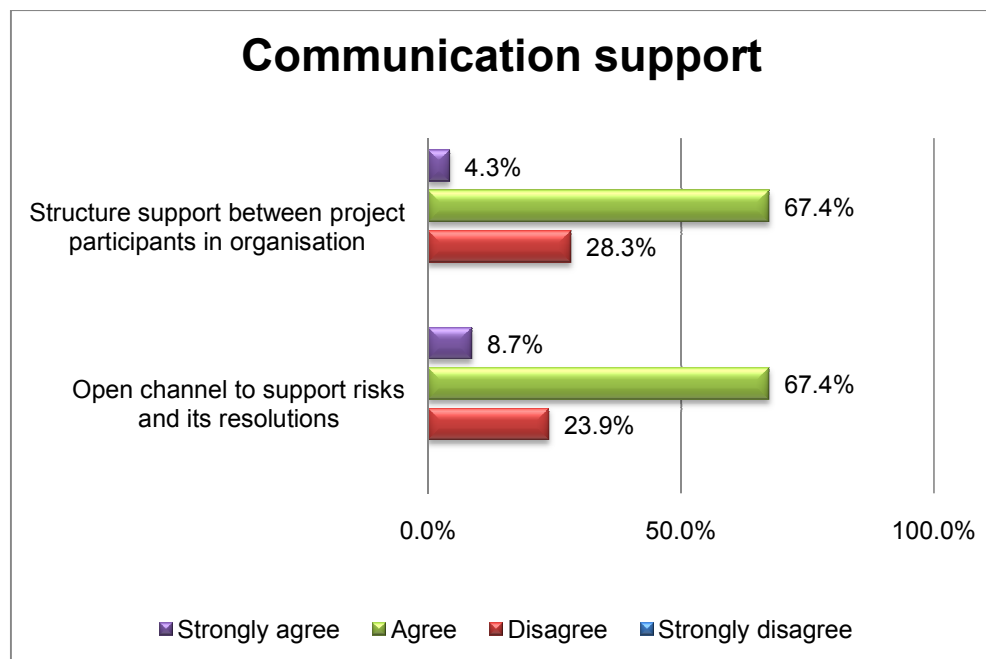


Table 3.10: Spearman's correlation – Communication

		My organisation enables an open communication channel for escalating and handling identified project risks and general issues.	The project organisational structure supports the communication and co-operation between the project participants.
My organisation enables an open communication channel for escalating and handling identified project risks and general issues.	Correlation Coefficient	1.000	.577**
	p-value	.	<0.0001
	N	41	41
The project organisational structure supports the communication and co-operation between the project participants.	Correlation Coefficient	.577**	1.000
	p-value	<0.0001	.
	N	41	41

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3.11 indicates a large practical significant correlation (0.557) between the statements that the respondent's organisation enables an open communication channel for escalating and handling identified risks and issues; and the organisational structure supports the communication and co-operation between project participants. The p-value is also much smaller than the level of significance of 0.05 that further indicates the statistical significant correlation between the two perceptions. An

organisation that has a supporting structure for communication in place, will lead to better risk identification and escalation of these risks between project participants.

Management applicability

Each resource must have clearly identified roles and responsibilities to which these identified issues can be communicated and managed. These communication layers will also assist in effective knowledge management where tacit knowledge must be acquired.

3.3.8 Roles and responsibilities

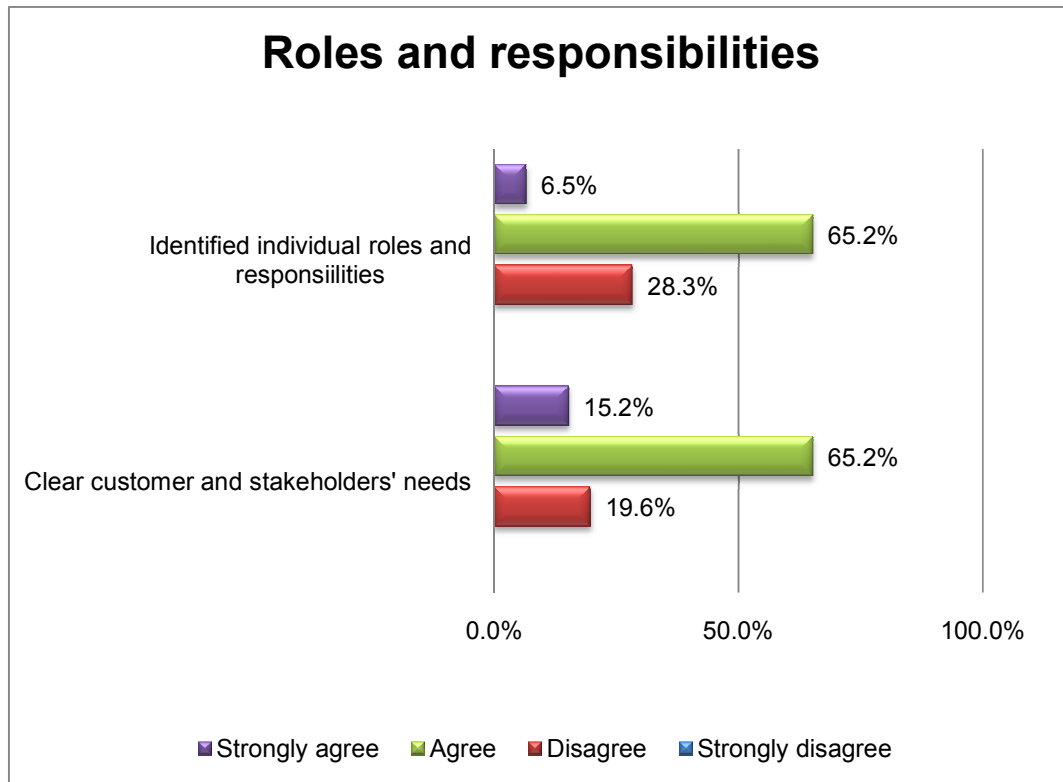
The general perception of the respondents regarding roles and responsibility during projects will now be discussed.

With each new project cycle all individuals must have clearly defined job descriptions and accountability. This is supported in graph 3.18 as 63.0% (Q31) of the respondents have clearly identified job descriptions and accountability that are documented. 28.3% of the respondents disagreed (Q23) whereas the rest of the respondents have clearly identified roles and responsibilities in their corresponding involvement in projects. The lack of clearly identified roles and responsibilities may:

- Reduce project risk assessment and monitoring levels.
- Increased time spent on the project tasks relating to rework and bugs fixing.

As indicated by graph 3.17, project related processes must be customer driven in order to decrease the product delivery time. 80.4% of the respondents indicate that their projects are focused on meeting their clients' needs (Q19).

Graph 3.17: Roles and responsibilities



Graph 3.18: Documented accountability

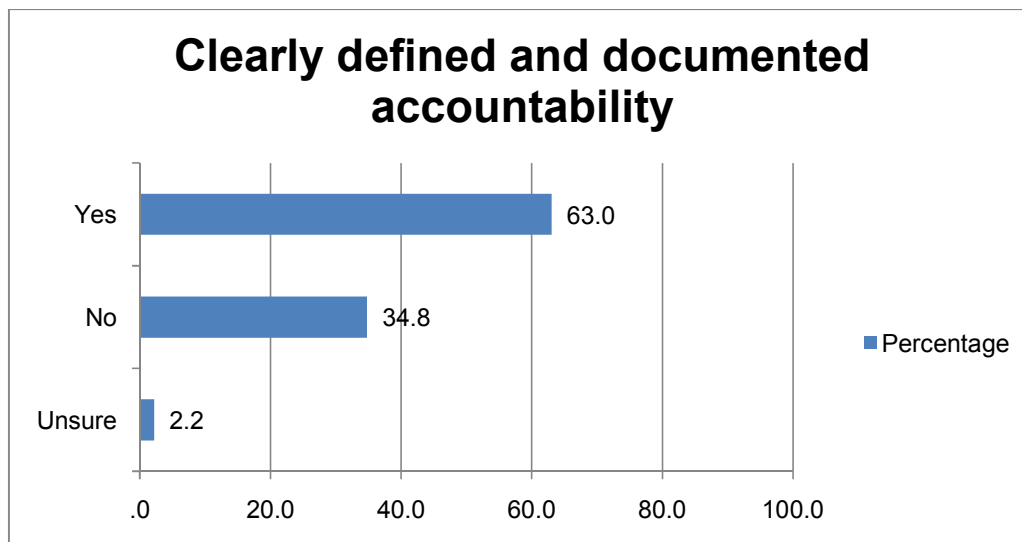


Table 3.11: T-test – Roles and responsibilities

	Are your accountability and job descriptions clearly defined and documented with each new project cycle?	N	Mean	Std. Deviation	Cohen's d-value	t	p-value
Each individual has clearly identified roles and responsibilities when involved in project execution.	No	16	2.44	.629	0.894	-3.266	.004
	Yes	29	3.00	.378			

A Cohen's d-value (0.894) indicates a large effect on the practical significant difference as perceived by the respondents. The p-value of 0.04 also shows a statistical significant difference as evaluated above (see table 3.12). The respondents, who are agreeing with the statement that each individual's roles and responsibilities are clearly defined, also indicate that their accountability and job descriptions are clearly defined and documented with each project cycle.

Management applicability

If everyone involved in projects realise their individual roles and responsibilities, their tasks will be a great deal clearer and better focus can be placed on meeting the customers' and stakeholders' needs.

3.3.9 Management of risk

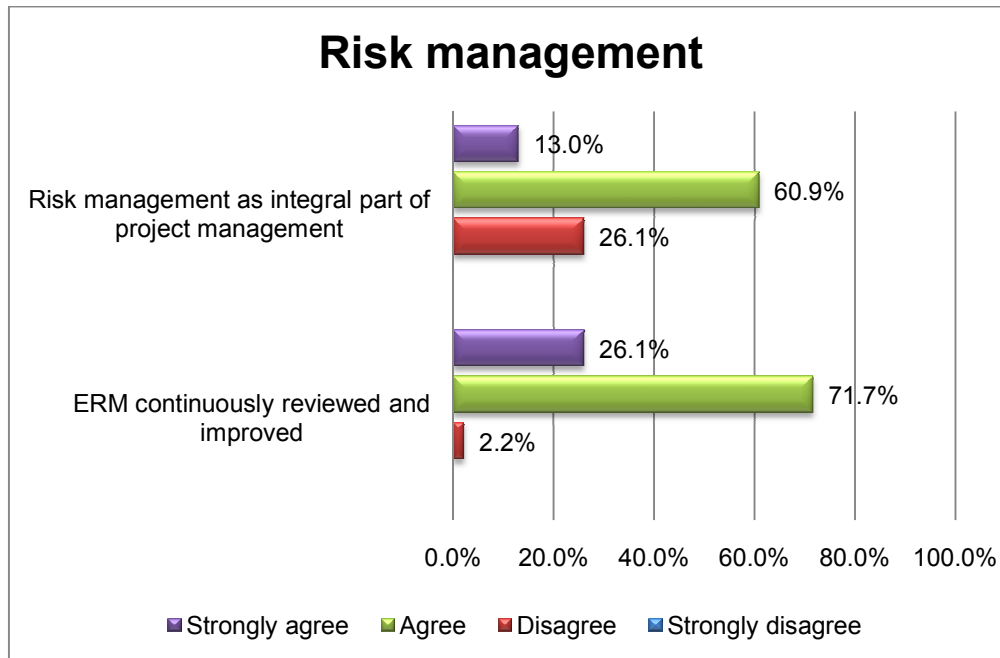
The following pertaining to the management of risk will now be discussed.

Almost all of the respondents (Q18 - 97.8%) showed positive perceptions towards the statement that risk management is an integral part of project management practices (see graph 3.19). Management has a responsibility towards risk management; graph 3.21 supports this statement with all of the respondents ranking it as either important or very important.

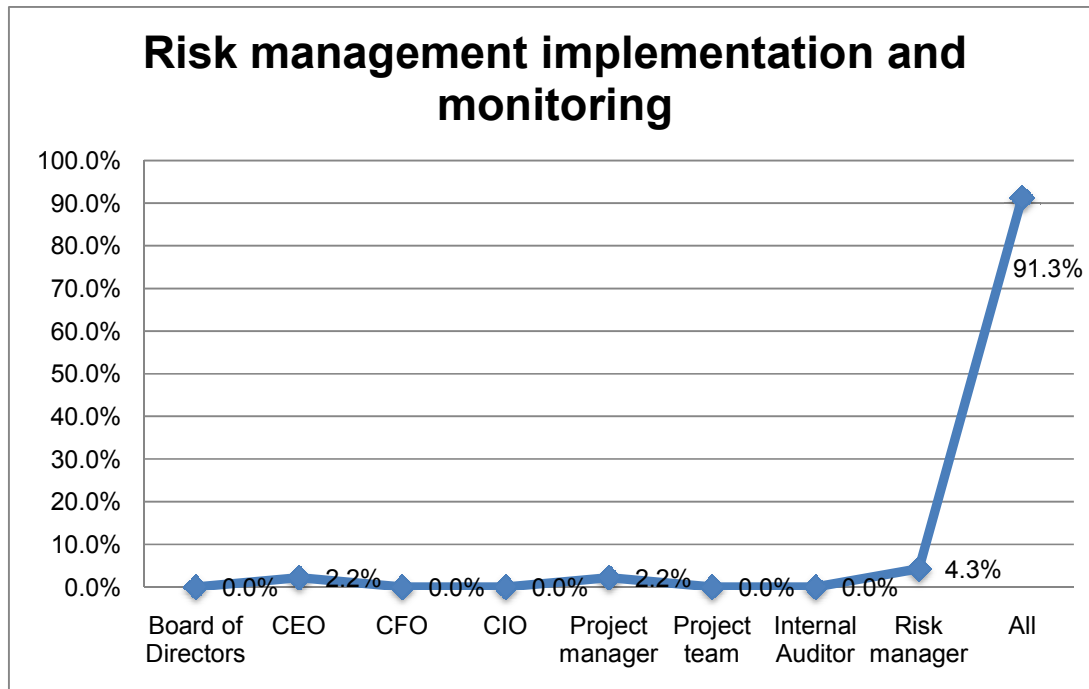
Literature further indicated that the risk management activity is not only the responsibility of the project manager and/or project team, but it is the responsibility of

all involved. Graph 3.20 conforms to this theory as 91.3% (Q35) of the respondents agreed. The ERM process must be continuously reviewed and improved (73.9% of the respondents either agreed or strongly agreed).

Graph 3.19: Risk management



Graph 3.20: Risk management implementation and monitoring



Graph 3.21: Management responsibility towards risk management

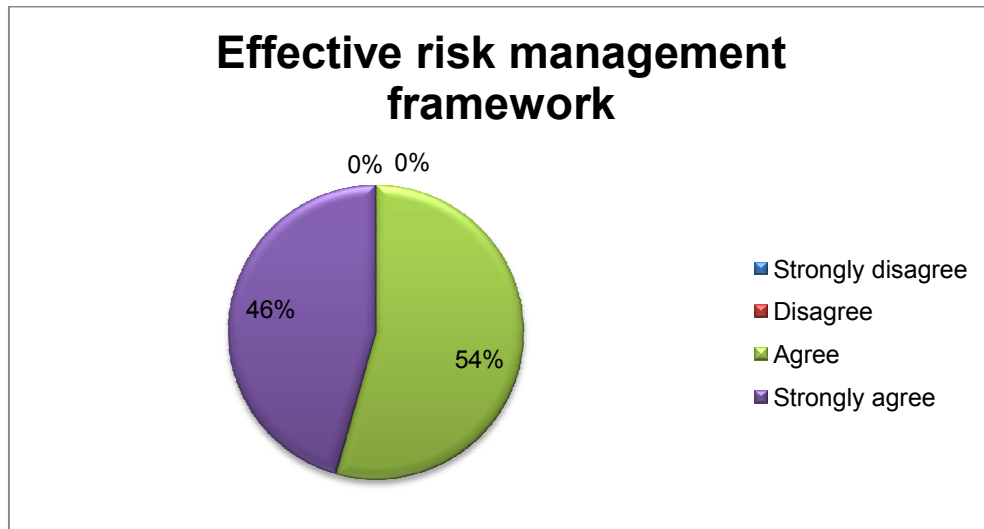


3.3.10 Frameworks within an organisation

The study's primary objective was to create a general project risk management framework that can assist management in their daily tasks of planning, evaluating

and executing critical IT projects, decisions and strategies. The survey has shown the following pertaining to an effective risk management framework within an organisation.

Graph 3.22: An effective risk management framework



The majority of respondents indicated that there is a strong need for an effective risk management framework within their organisation in order to improve the performance levels. From graph 3.22 it can be seen that all of the respondents agreed (Q26 - 46% strongly agreed) with the statement, therefore 0% of them had shown any negative perception towards the need of an effective risk management framework within an organisation.

Graph 3.23 also supports the implementation of these frameworks but also indicates that these frameworks must be accompanied by supporting systems. The majority of respondents also attached a high importance level to the implementation of correct frameworks and processes within an organisation (Q39_10). All of the respondents attached a positive perception (61% linked it to very important); therefore none of them had shown any negative attitude towards the implementation of frameworks along with other organisational processes.

Graph 3.23: Correct frameworks along other processes

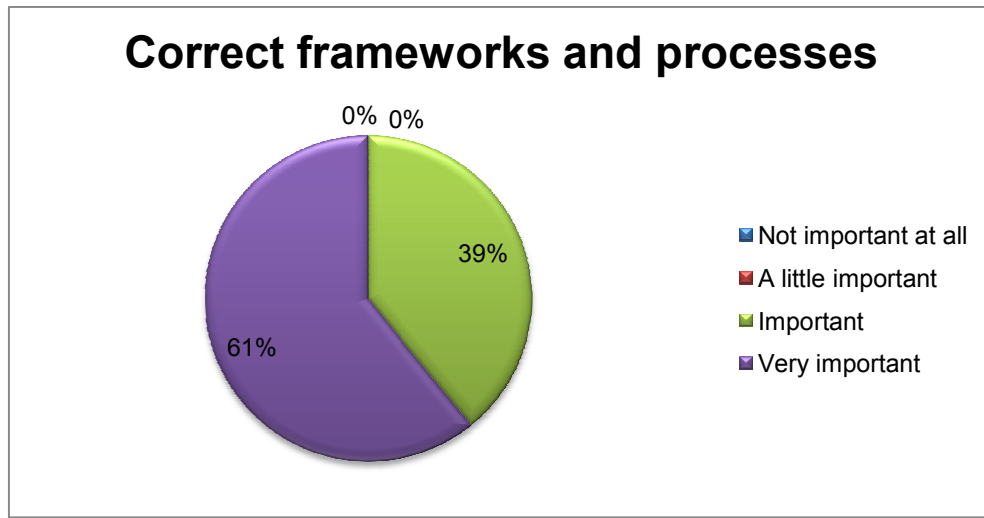


Table 3.12: Spearman's correlation – Frameworks

		An effective risk management framework can improve your organisation's performance.	Implement correct frameworks and processes.
An effective risk management framework can improve your organisation's performance.	Correlation Coefficient	1	.539**
	p-value	.	<0.0001
	N	41	41
Implement correct frameworks and processes.	Correlation Coefficient	.539**	1
	p-value	<0.0001	.
	N	41	41

**, Correlation is significant at the 0.01 level (2-tailed).

Table 3.13 indicates a strong practical significant correlation (0.539) between an effective risk management framework (Q26) that is closely linked to the organisation's performance levels and the implementation of correct frameworks and processes (Q39_10). The p-value is also much smaller than the level of significance of 0.05 that further emphasizes the statistical significant correlation between the two perceptions. Although processes must be in place in any organisation to support daily operations, the importance of an effective risk management framework forms an integral part of such operations.

This further supports the primary objective of the study in that there is a need to implement an effective risk management framework alongside other processes in order to improve the overall organisation's performance.

3.3.11 Framework versus Industry

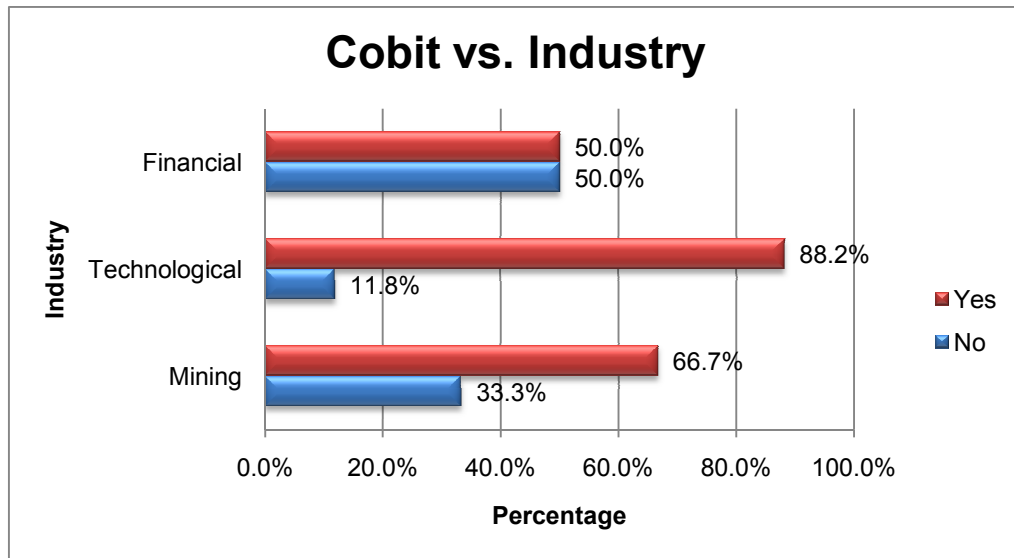
From the literature study there seems to be a strong relation between the methodology/framework implemented and the specific industry type. The COBIT construct as an IT focused framework is expected to raise more awareness in the technological arena. As previously stated, the majority of the respondents are from the Mining, Technological, and Financial industries (Q6). The analysis will therefore be evaluated from these main types.

The survey results will now be evaluated for the frameworks in accordance to the industry type.

3.3.11.1 COBIT versus Industry

COBIT is a comprehensive framework that aims at effective management of IT to assist organisations in gaining competitive advantage from these valuable assets. The survey indicates that all of the industries are aware of this framework and that a practical significant dependency exists among these industries.

Graph 3.24: COBIT and the industry



From table 3.14 the results indicate that no statistically sufficient evidence exists that the type of industry of the respondents will have an influence on their awareness level towards COBIT ($p > 0.05$). The phi value of 0.368, however, indicates that there is a practical significant dependency between the awareness levels towards COBIT and the industry type of the respondents. The largest percentage (88.2%) of the respondents in the technological industry is mostly aware of the COBIT framework.

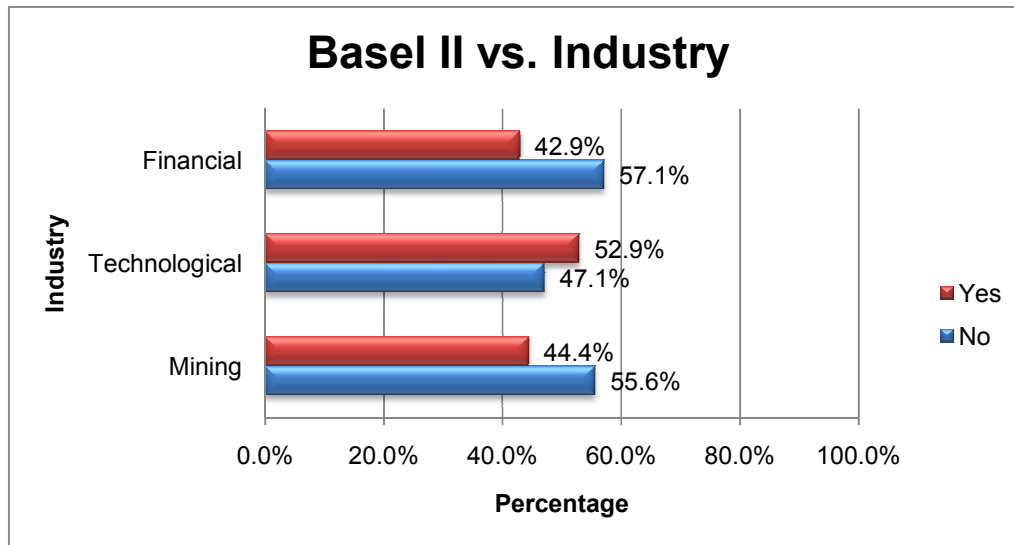
Table 3.13: Chi-square test on COBIT

	Value	df	p-value
Pearson Chi-Square	5.406 ^a	2	.067
Likelihood Ratio	5.689	2	.058
Phi	.368		

3.3.11.2 Basel II versus Industry

The Basel II framework is focused on the global banking sector in order to identify and manage increased financial risks. The survey indicates that all of the industries are aware of this framework although there are no statistical and practical significant dependencies among these industries.

Graph 3.25: Basel II and the industry



From table 3.15 the results indicate that there is no statistically sufficient evidence that the type of industry of the respondents will have an influence on their awareness level towards Basel II ($p > 0.05$). The phi-value of 0.094 further indicates that there is also no practical significant dependency between the awareness levels of Basel II and the industry type of the respondents.

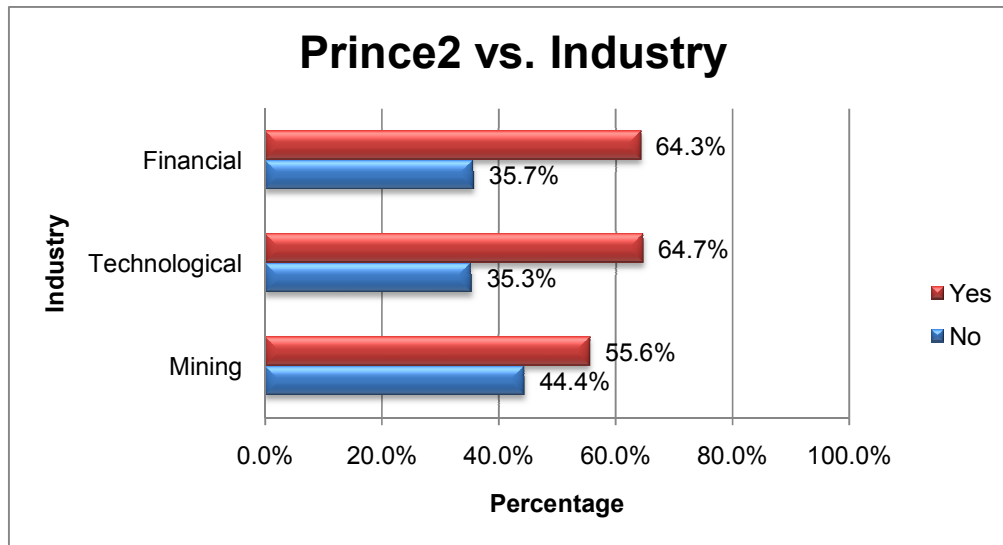
Table 3.14: Chi-square test on Basel II

	Value	df	p-value
Pearson Chi-Square	.357 ^a	2	.837
Likelihood Ratio	.357	2	.837
Phi	.094		

3.3.11.3 Prince2 versus Industry

The Prince2 is a project management guiding tool that was first introduced as a standard for IT project management.

Graph 3.26: Prince2 and the industry



From table 3.16 the results indicate that there is no statistically sufficient evidence that the type of industry of the respondents will have an influence on their awareness level towards Prince2 ($p > 0.05$). The phi-value of 0.077 further indicates that there is also no practical significant dependency between the awareness levels of Prince2 and the industry type of the respondents.

The survey further indicates that all of the industries are aware of this management tool with the highest percentage within the technological industry (64.7%); although this percentage is on average very closely related to the other two industry types (see graph 3.26).

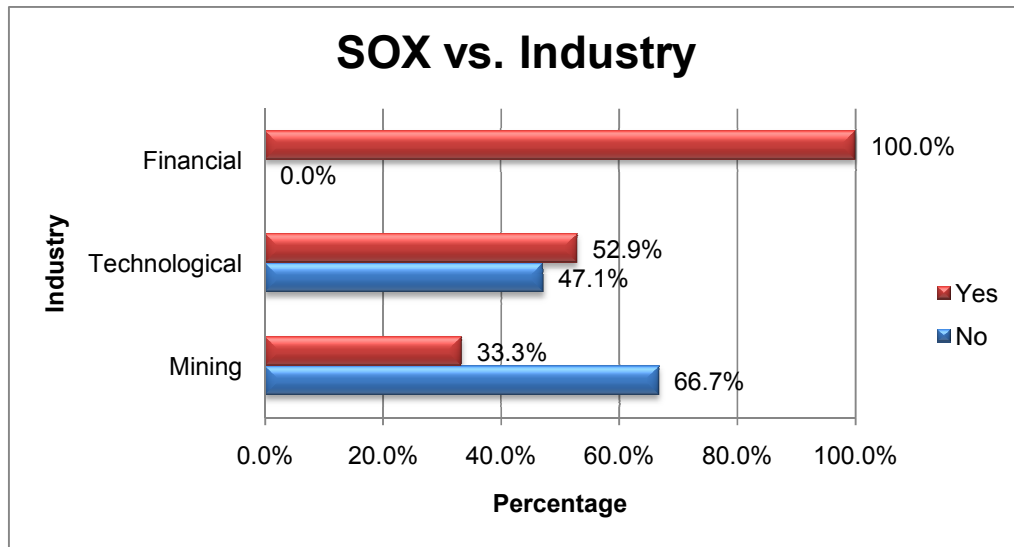
Table 3.15: Chi-square test on Prince2

	Value	df	p-value
Pearson Chi-Square	.240 ^a	2	.887
Likelihood Ratio	.236	2	.889
Phi	.077		

3.3.11.4 SOX versus Industry

The survey indicates that all of the industries are aware of the SOX construct with all of the respondents in the financial industry indicating a 100% awareness level.

Graph 3.27: SOX and the industry



From table 3.17 the results seem statistically sufficient in that the type of industry of the respondents will have an influence on their awareness level towards SOX ($p < 0.05$). The phi value of 0.561 further indicates that there is a large practical significant dependency between the awareness levels towards SOX and the industry type of the respondents.

SOX enables business to harvest gained knowledge by promoting a single view of the truth by means of single repository implementations for documentation of policies. Although SOX is more strictly followed in the financial industry, management from other industries will also benefit from the repository guidance provided by SOX.

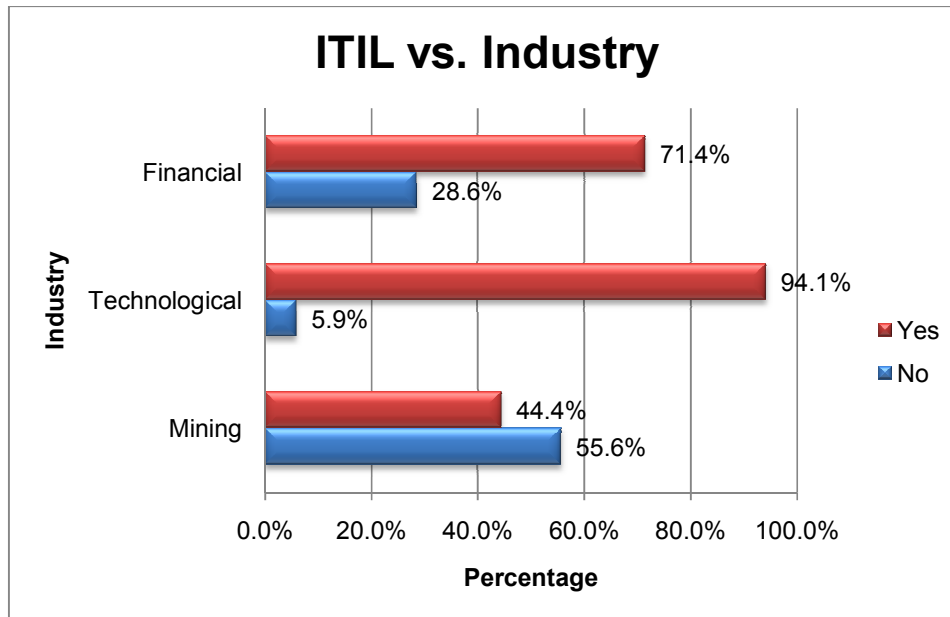
Table 3.16: Chi-square test on SOX

	Value	df	p-value
Pearson Chi-Square	12.592 ^a	2	.002
Likelihood Ratio	16.830	2	.000
Phi	.561		

3.3.11.5 ITIL versus Industry

ITIL is an IT service management approach that consists of a cohesive set of best practice guidance tools. The survey indicates that all of the industries are aware of the ITIL construct with the highest awareness percentage coming from the technological industries.

Graph 3.28: ITIL and the industry



From table 3.18 the phi-value of 0.444 indicates there is a practical significant dependency among the industry types and the participants' awareness regarding ITIL. The Chi-square test's p-value of 0.019 further indicates an important statistical significant dependency.

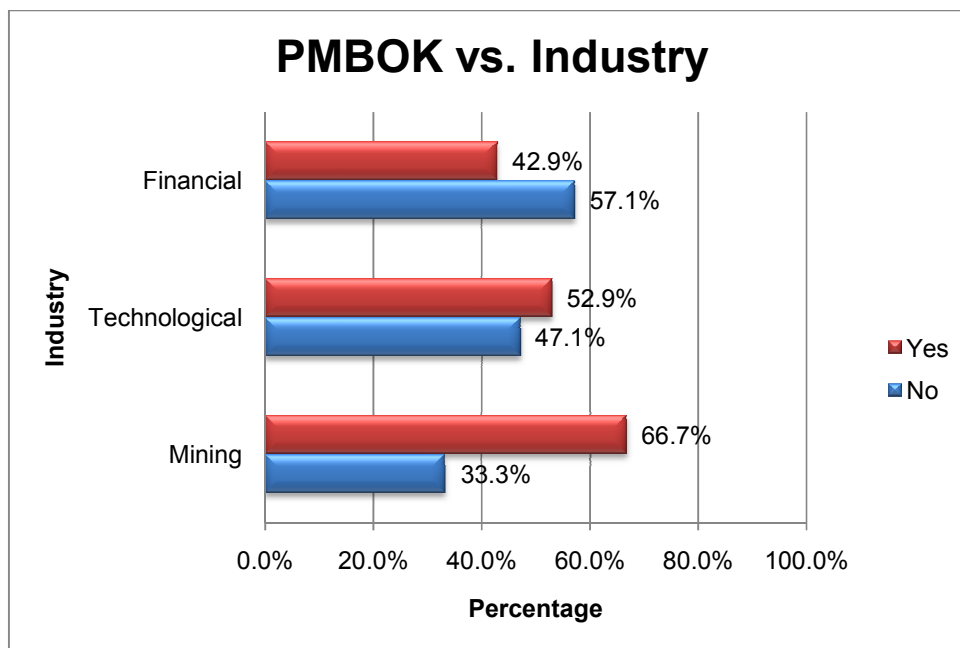
Table 3.17: Chi-square test on ITIL

	Value	df	p-value
Pearson Chi-Square	7.890 ^a	2	.019
Likelihood Ratio	8.264	2	.016
Phi	.444		

3.3.11.6 PMBOK versus Industry

PMBOK is the sum of knowledge within the profession of project management. The survey indicates that all of the industries are aware of the PMBOK construct with 66.7% awareness coming from the mining industries.

Graph 3.29: PMBOK and the industry



From table 3.19 the results indicate that there is no statistically sufficient evidence that the type of industry of the respondents will have an influence on their awareness level towards PMBOK ($p > 0.05$). The phi-value of 0.117 further indicates that there is little or no practical significant dependency between the awareness levels of PMBOK and the industry type of the respondents.

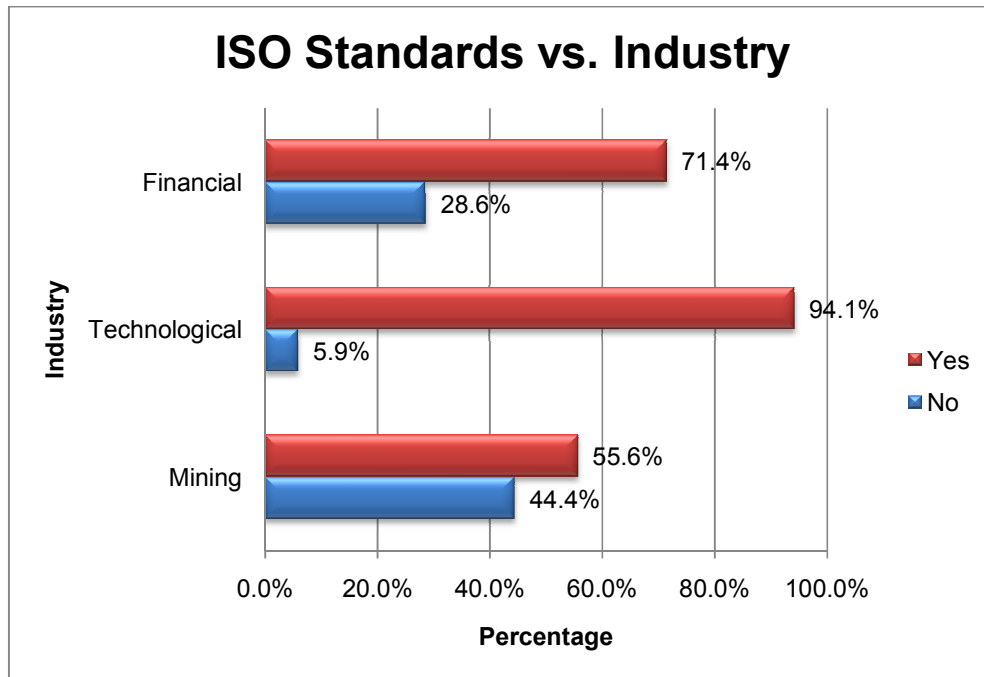
Table 3.18: Chi-square test on PMBOK

	Value	df	p-value
Pearson Chi-Square	1.248 ^a	2	.536
Likelihood Ratio	1.265	2	.531
Phi	.177		

3.3.11.7 ISO standard versus Industry

The survey indicates that all of the industries are aware of the ISO standards with 94.1% awareness coming from the technological industries.

Graph 3.30: ISO standards and the industry

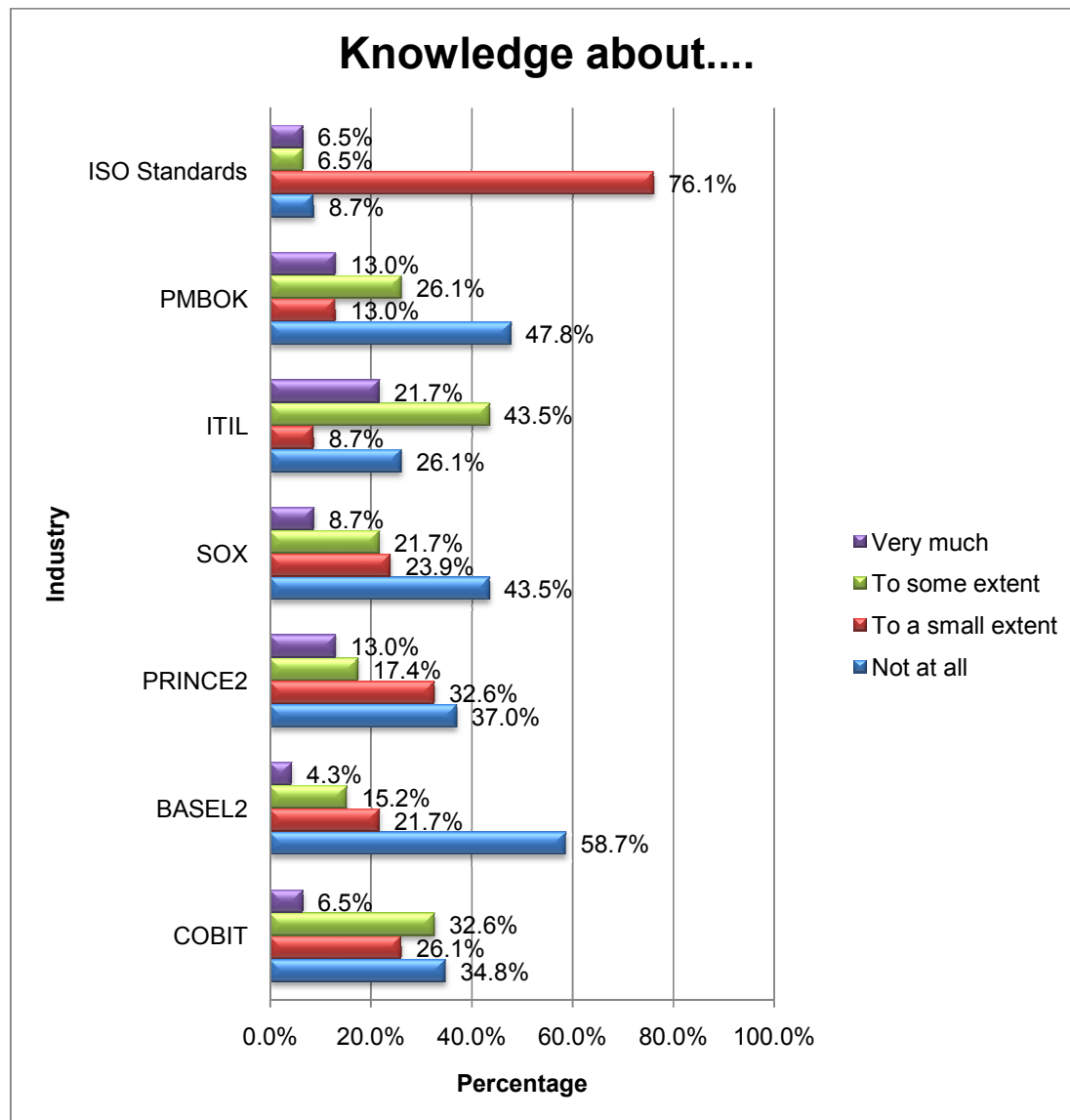


From table 3.20 the results indicate that no statistical sufficient evidence exists that the type of industry of the respondents will have an influence on their awareness level towards ISO standards ($p > 0.05$). However, the phi-value of 0.370 reflects that there is a practically visible dependency between the awareness levels towards ISO standards and the industry type of the respondents.

Table 3.19: Chi-square test on ISO standards

	Value	df	p-value
Pearson Chi-Square	5.474 ^a	2	.065
Likelihood Ratio	5.930	2	.052
Phi	.370		

Graph 3.31: Participants' knowledge towards methodologies/frameworks



Participants' knowledge towards methodology/framework

The previous section identified respondents' awareness levels towards frameworks/methodologies. This section will however describe the degree of knowledge that each respondent contains within these methodologies/frameworks.

If we evaluate the participant responses that did not indicate "Not at all" towards their independent knowledge, then the following is worth identifying (see graph 3.31):

- The average participant's knowledge about ISO standards are very limited (76% indicating a small extent of knowledge). ISO standards provide guidance to organisations on various levels such as the ISO 31000 that focuses on implementing effective risk management. It seems that those participants that are aware of ISO standards are only qualified or experienced on an introductory level.
- The highest proportion of knowledge was derived from ITIL that consisted of 21.7% of the participants indicating a strong knowledge basis; 43.5% indicating knowledge of some extent and only 8.7% showing a small extent of knowledge towards ITIL.

Organisations must ensure a culture of knowledge sharing in order to gain from these methodology/framework backgrounds.

3.4 SUMMARY

This chapter analysed the data collected via the electronic survey from various sources. The information was analysed and the following important concerns were identified:

- Critical issues and risk must be properly managed throughout the project management life cycle. It simply will not suffice with only managing some stages of the project cycle.
- Information audits form an integral part in maximising IS and technologies. It must be aligned with the overall organisational strategy.
- Strategy, performance and sustainability are inseparable assets of any organisation.
- IT governance perceived by organisations as important, can improve its competitive value with effective risk practices like risk methodology and data management.
- Knowledge management will lead management towards better competitive positions as well as increasing the overall organisational performance levels.

- Risk identified during project lifecycles must be well documented and this gained knowledge must be shared to reduce future issues regarding risk management.
- The implementation of risk support systems to enable business management to anticipate future conditions and plan accordingly. These systems will add value to the management of a continuous improvement process.
- Organisations must enable a culture that supports an open communication for not only identifying and escalating risk and issues, but also to enable each project participant in their responsibilities towards each task.

These empirical results combined with the previous literature study were analysed in order to form a holistic view regarding project risk management. The discussion on the proposed framework and its components are discussed in the next chapter.

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

4.1 INTRODUCTION

From the literature review, key project risk management components emanated. The literature indicated that a need exists for a robust risk management framework to assist management in sound risk-based decision-making. These risks are unavoidable and can get very complex if not carefully evaluated and aligned with the general organisational strategy. Organisations must give assurance to stakeholders that all the potentially significant risks are identified and properly managed during any project life cycle.

An effective risk management process provides executives with the required information to implement strategic business decisions with confidence. Governance models must further be implemented to assist managers in the risk process although no definite model was prescribed by the previously conducted literature.

This chapter will take the information from the previous chapters in this study and combine it to develop a proposed general framework for project risk management in the IT environment.

The chapter will commence by discussing the framework, and the chapter will conclude with a summary of the study as well as recommendations for further study.

4.2 GENERAL FRAMEWORK

The framework that was developed can be seen as a multipurpose framework that can be utilised as a model to manage risks associated with IS, IT project investments and so forth. The framework can further be utilised by any organisation that uses any form of IM as opposed to only IT departments or organisations. This framework can also be useful to organisations in developing and expanding existing project risk management processes to facilitate the preparation and practical implementation in

order to give assurance to stakeholders that all potentially momentous risks are identified and properly managed.

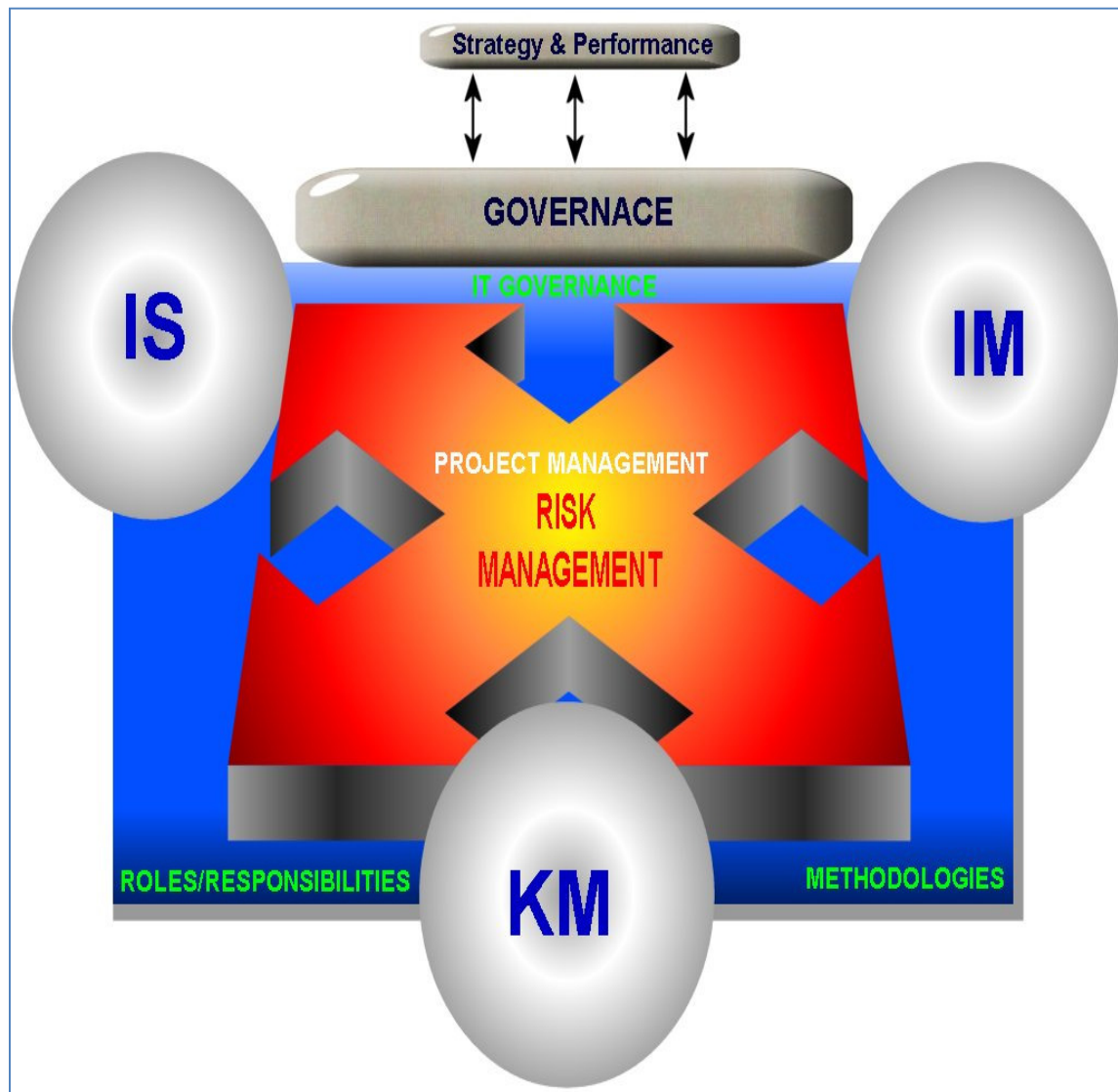
The propositions discussed in this chapter pertain to the specific objective of the study, namely to propose and define a general reference framework that describes an optimal project risk management process plan for IT projects in South Africa. Figure 4-1 illustrates the proposed framework.

The main components of the proposed framework will now be discussed in the following section.

4.2.1 Framework components

It is important to realise that the project risks management process is not only the project manager's role but rather a holistic mindset of all involved implementing, assessing, reviewing and continuous monitoring the process to ensure a tight fit with the strategic alignment of the organisation in general.

Figure 4-1: Project risk management framework in the IT environment



The framework's components will now be discussed:

4.2.1.1 Strategy

- *Business strategy.*

Information technology projects have an enormous impact on core business functions and management must ensure that effective risk management is implemented and aligned with the organisation's overall business strategy. Efficient risk management will become more apparent where Information Systems, Information Management, and Knowledge Management strategies overlap that may prohibit an increase in business values if not managed effectively. Ownership and control towards each strategy type will also increase organisational risk levels.

- *Performance measurement*

Organisations must monitor and control risks on a continuous basis within the project lifecycle by means of an Enterprise Risk Management process. These performance level results must be further compared against the overall business strategy in order to track strategy implementation. Measurable strategic objectives must be constantly reviewed and communicated to shareholders. The absence of risk control and risk management can be destructive towards the overall business performance.

- *Shareholder involvement*

Shareholder involvement within projects may be many and possibly diverse in several respects like interests, expectations and needs. Shareholders require transparency and high standards of corporate governance that must therefore function in an environment that cultivates open communication channels. Project managers must further establish and ensure good relationships in order to promote healthy communication within projects.

4.2.1.2 Project management

- *Roles and responsibilities*

The establishment of clearly defined roles and responsibilities is essential for escalating risks to the required resource and to further enhance communication channels. Critical issues and risk must be properly managed throughout the project lifecycle as it will not suffice if only some stages are managed. Well oiled project planning and execution still require the identification, relationship with and management of project stakeholders in order to be successful.

- *Top management involvement*

Top management involvement is essential for establishing corporate governance within an organisation. Top management involvement as an essential risk factor, must be attained with each new project intervention along with the required sponsor support.

- *Environmental impact analysis*

Legislation of South Africa requires that Environmental Impact Assessment be completed prior to any project implementation.

- *Management tools*

Many best practice tools exist to assist management in their approach towards project management. Prior analysis of implementation must be assessed by management in order to fit to their specific organisational needs as none of them ensures project success. Prince2 can be applied to various project types whereas PMBOK focuses more on individual projects.

4.2.1.3 Risk management

- *Governance*

Governance, as the binding glue for organisations, has been one of the fastest growing elements of risk management. IT governance must be driven by corporate governance. IT governance must further ensure that IT risks are effectively managed as risk management is one of the key drivers in ensuring stable shareholder value. Organisations must further develop and implement plans to evaluate and improve the effectiveness of risk management. These methods will enable top management to obtain reasons behind project failures and also to reduce future risks.

- *Audit & control*

Top management must perceive regulatory compliance as an effective tool to monitor and improve business performance. An emphasis on risk management within an organisation will improve performance and competitiveness within the market. Information audits form an integral part in maximising IS and technologies that must be aligned with the overall business strategy.

- *Existing governance tools*

Governance tools like COBIT can add value to an organisation by communicating risk and therefore clarify the level of control to shareholders. The King III report provides for a comprehensive source of best practice principles towards risk management and was also highly ranked by the empirical study results. King III as non-legislated code towards JSE Securities Exchange, states that a company should have a risk assessment framework in place to enable management to pro-actively and continuously address risks. Various ISO standards can be used in conjunction with these management tools like the ISO 31000 risk management standard to guide in effective implementation of risk practices.

- *Communication*

Communication lies at the heart of effective risk management establishing critical links between shareholders' needs; information distribution; performance reporting; and management of issues towards shareholders.

4.2.1.4 Knowledge management

- *Culture*

Knowledge management must be applied throughout the organisation and must in turn cultivate open communication channels. Challenges exist in documenting and sharing this knowledge by means of support systems or tacit transfer methods. Knowledge management will lead management towards better competitive positions as well as increasing the overall organisational performance levels.

- *Supporting systems*

Supporting risk management systems is crucial for capturing and sharing knowledge within an organisation. These knowledge assets will either be stored in IS or retrieved via tacit knowledge from human resources. It is therefore paramount that a culture of knowledge sharing is implemented to gain from various resource knowledge bases regarding existing frameworks/methodologies. The implementation of risk support systems will enable business management to anticipate future conditions and to plan ahead.

4.2.1.5 Information systems

- *Flexibility*

Defined roles and responsibilities must be flexible enough to fit to the size and complexity within projects. The rapidly changing technological environment will trigger management to change their underlying IS, but great care should be taken in identifying if the underlying architecture is flexible

enough to support the newly proposed architecture and if the need exists to gain competitive advantage.

- *Competitive advantage*

Thriving organisations understand the payback of IT investments and its relation to core business processes. IT governance perceived by organisations as important, can improve its competitive value with effective risk practices like risk methodology and data management.

- *Shareholder value*

Shareholder values can be delivered by [1] aligning information systems with business strategies, and [2] information that is applied through effective knowledge management initiatives.

4.2.1.6 Information management

- *Value driven*

Top management must ensure that information management is executed as an essential asset and that it is the responsibility of the organisation as a whole. IT projects must also be seen as a vital asset to add further value to organisations.

4.3 RECOMMENDATIONS FOR FURTHER STUDY

Following from this study is a number of research fields that require more detailed study, including:

- Research based on the implementation of the King III report on corporate governance and the implication of non conformance to this report from both the private and public sectors' perspectives.
- The development of a generic performance measurement framework that assists in the monitoring of information projects.
- The assessment of project failures and successes across different project sizes.

- A model for managing competitive risk in strategic IT initiatives.
- A study to identify the strategic relation between the time of implementing information projects and the increase on the return on investment.
- Change management model in relation to project risk management in the complete lifecycle of projects.
- Technology risks within an organisation's asset management system.

4.4 GENERAL CONCLUSION

The study determined the components that should be included in the proposed project risk management framework. Although the study attempts to combine a vast variety of concepts with different professional academics, the identified components can be used by management as a starting point to determine and evaluate their projects from a risk perspective within their IT environment.

Project management tools like PMBOK and Prince2 can be used in conjunction with the proposed framework to assist management in the overall methodology of evaluating critical projects. Tools like COBIT can also further assist management in the process of aligning IT with the corporate governance strategy.

Management must note that the extent to which such tools are deployed in the organisation depends on the firm's particular needs, and it is suggested that such needs be analysed prior to deployment. The study also indicated that more methodologies and frameworks expand their approaches by means of adding more value to the risk management element within an organisation.

The Board should realise that strategy, risk, performance and sustainability are inseparable assets as laid out in the King III report. The most effective way to implement or improve risk management within an organisation is to align these practices with the overall business strategy.

The strategy must cultivate an open communication channel within projects; clearly assign roles and accountability, enforce a repository support system to monitor and

evaluate risks, and to drive risk awareness throughout the organisation. This will ultimately determine the level of an organisation's managerial excellence.

Although legislation stipulates that organisations must follow a model in order to add stable shareholder value, it is unclear to management which existing model to follow. The bottom line is that there should be no need for South African government to enforce such critical practices as it should be seen as a second nature management element within any business strategy layout.

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Annexure A

ANNEXURE A: PROJECT RISK MANAGEMENT QUESTIONNAIRE

A. Instructions for completion of the questionnaire:

- The questionnaire consists of 39 questions, some referring to specific aspects of project risk management, while others are more general.
- It will take about 15 minutes to complete the questionnaire.
- There are no right or wrong answers.
- Questions are answered by selecting the number that best characterises the situation, for example:

Q Please select your age group (in years)

Less than 20	21 to 30	31 to 40	41 to 50	51 to 60	Older than 60
1	2	3	~~4~~	5	6

Q Please select your job title.

Technical or Clerical	1
Supervisor	2
Assistant Manager	~~3~~
Manager	4
Division Manager	5
CFO	6
CEO	7
Other	8
If other please specify	

- If you answer “Other”, please use the space provided in the “*If other, please specify*” field to write comments.
- If you cannot answer the question, choose “*Unsure*” where applicable. Please use this option sparingly.

Please complete questions 1 to 39 on pp. 2 to 5 now.

Confidentiality of your response is guaranteed.

Thank you for your time.

Annexure A

B. Questions:

-----Section A: Demographic Information-----

1. Please select your age group (in years).

Less than 20	21 to 30	31 to 40	41 to 50	51 to 60	Older than 60
1	2	3	4	5	6

2. Please select your gender.

Male	Female
1	2

3. Please select your job title.

Technical or Clerical	1
Supervisor	2
Assistant Manager	3
Manager	4
Division Manager	5
CFO	6
CEO	7
Other	8
If other please specify	

4. Highest qualification obtained.

Matriculation	Tertiary Certificate or Diploma	University Degree	Post Graduate Degree
1	2	3	4

5. How many years have you been working for your organisation?

0 to 5	1
6 to 10	2
11 to 15	3
16 to 20	4
21 to 25	5
26 to 30	6
More than 30	7

-----Section B: Information about participants' organisation-----

6. Please select your organisation's industry.

Mining	1
Technological	2
Agriculture	3
Manufacturing	4
Finance	5
Retail	6
Other	7
If other, please specify	

Annexure A

7. Describe the size of your organisation in terms of: Turnover per annum (Rand in Millions)

Less than 1	1
1 to 24	2
25 to 74	3
75 to 99	4
100 to 124	5
125 to 149	6
150 to 174	7
175 to 200	8
More than 200	9

8. When is your organisation planning to change/upgrade their internal information systems again?

Unsure	This year	2 to 3 years	4 to 5 years	More than 6 years	Busy implementing
1	2	3	4	5	6

-----Section C: Project and Risk Management -----

9. How do you rate the preliminary assessments and evaluation of your company's internal/external projects?

Unsure	Bad	Moderate	Good	Excellent
1	2	3	4	5

10. How do you rate the design layouts of the projects?

Unsure	Bad	Moderate	Good	Excellent
1	2	3	4	5

11. How would you rate the management of critical issues and problems encountered during project planning?

Unsure	Bad	Moderate	Good	Excellent
1	2	3	4	5

12. How would you rate the management of critical issues and problems encountered during project execution?

Unsure	Bad	Moderate	Good	Excellent
1	2	3	4	5

13. How would you rate the risk assessment/evaluation process during the project management life cycle?

Unsure	Bad	Moderate	Good	Excellent
1	2	3	4	5

14. Information audits generally have the purpose to maximize the leverage of investments in information systems and technologies, ensuring the strategic alignment with the overall goals and mission of the organisation.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

15. Knowledge is a very valuable asset in our organisation.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

Annexure A

16. A project risk continuity plan, together with the governance of this plan, as well as proper structures is imperative.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

17. The management of business information knowledge is useful to gain competitive advantage.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

18. The risk management process is seen as an integral part of project management.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

19. The customer and stakeholders' needs had been clearly understood to ensure that all project-related processes focus on meeting their needs.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

20. The risk practices like risk methodology and data management add competitive value to effective IT governance.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

21. The sharing of knowledge increases the overall business performance.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

22. My organisation enables an open communication channel for escalating and handling identified project risks and general issues.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

23. Each individual has clearly identified roles and responsibilities when involved in project execution.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

24. Techniques are being used in the projects to prioritise, manage and record the identified risks and its resolutions.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

25. The project organisational structure supports the communication and co-operation between the project participants.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

26. An effective risk management framework can improve your organisation's performance.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

27. The organisation's Enterprise Risk Management process is continuously reviewed and improved.

Strongly disagree	Disagree	Agree	Strongly agree
1	2	3	4

28. Performance measurement activities are seen as

Strongly	Disagree	Agree	Strongly agree
----------	----------	-------	----------------

Annexure A

paramount within the organisation.

disagree			
1	2	3	4

29. Has a system been put in place to collect and analyse the information gained during/ after projects for use in a continual improvement process?

Unsure	No	Yes
1	2	3

30. Do project risks form part of the project progress reports?

Unsure	No	Yes
1	2	3

31. Are your accountability and job descriptions clearly defined and documented with each new project cycle?

Unsure	No	Yes
1	2	3

32. Do you perceive regulatory compliance to be adding too much additional pressure/overhead to your daily operations?

Unsure	No	Yes
1	2	3

33. Does your organisation make use of the King III governance model?

Unsure	No	Yes
1	2	3

34. If you answered "No" in question 33 above then please specify your organisation's governance model below:

35. Risk management is the activity that must be assessed, implemented and monitored by the... (Please select only one option).

Board of Directors	1
CEO	2
CFO	3
CIO	4
Project manager	5
Project team	6
Internal Auditor	7
Risk manager	8
All of the above	9

36. Are you aware of the following framework/methodology? Please mark per row statement.

	No	Yes
COBIT	1	2
Basel II	1	2
Prince2	1	2
SOX	1	2
ITIL	1	2
PMBOK	1	2
ISO standards	1	2

37. How much knowledge do you have about... (Please mark per row statement).

	Not at all	To a small extent	To some extent	Very much
COBIT	1	2	3	4

Annexure A

Basel II	1	2	3	4
Prince2	1	2	3	4
SOX	1	2	3	4
ITIL	1	2	3	4
PMBOK	1	2	3	4
ISO standards	1	2	3	4

38. To what degree in general would you say does your organisation follow one or more of those mentioned in question 37 above?

Unsure	Not used	Some aspects	Followed	Strongly followed
1	2	3	4	5

39. How important do you consider each of the following regarding project risk management?

		Not important at all	A little important	Important	Very important
1	Strategy, risk, performance and sustainability are inseparable assets	1	2	3	4
2	Governance should manifest into a documented risk management policy plan	1	2	3	4
3	IT governance	1	2	3	4
4	The need and role of internal audit	1	2	3	4
5	Audit committee involvement	1	2	3	4
6	Identification of risk tolerance levels	1	2	3	4
7	Risk committee involvement and responsibility	1	2	3	4
8	Management responsibility towards risk management	1	2	3	4
9	Risk monitoring on continuous basis	1	2	3	4
10	Implement correct frameworks and processes	1	2	3	4

~~~~~ End ~~~~~

ANNEXURE B: RESULTS: QUESTIONNAIRE

Table B-1: Section A: Demographic information

| Question (Q) | Less than 20 (%)          | 21 to 30 (%)                        | 31 to 40 (%)          | 41 to 50 (%)             | 51 to 60 (%)         | Older than 60 (%) |
|--------------|---------------------------|-------------------------------------|-----------------------|--------------------------|----------------------|-------------------|
| Q1           | 0.0%                      | 10.9%                               | 39.1%                 | 34.8%                    | 13.0%                | 2.2%              |
| Question (Q) | Male (%)                  | Female (%)                          |                       |                          |                      |                   |
| Q2           | 78.3%                     | 21.7%                               |                       |                          |                      |                   |
| Question (Q) | Technical or Clerical (%) | Supervisor (%)                      | Assistant Manager (%) | Manager (%)              | Division Manager (%) | CFO (%)           |
| Q3           | 0.0%                      | 8.7%                                | 13.0%                 | 50.0%                    | 19.6%                | 0.0%              |
| Question (Q) | Matriculation (%)         | Tertiary Certificate or Diploma (%) | University Degree (%) | Post Graduate Degree (%) | Missing (%)          | CEO (%)           |
| Q4           | 2.2%                      | 8.7%                                | 50.0%                 | 97.8%                    | 2.2%                 | 2.2%              |
| Question (Q) | 0 to 5 (%)                | 6 to 10 (%)                         | 11 to 15 (%)          | 16 to 20 (%)             | 21 to 25 (%)         | 26 to 30 (%)      |
| Q5           | 52.2%                     | 21.7%                               | 13.0%                 | 4.3%                     | 4.3%                 | More than 30 (%)  |
|              |                           |                                     |                       |                          |                      | 0.0%              |

## Annexure B

**Table B-2: Section B: Information about participants' organisation**

| Question (Q) | Mining (%)      | Technological (%) | Agriculture (%)  | Manufacturing (%) | Finance (%)           | Retail (%)            | Other (%)          |
|--------------|-----------------|-------------------|------------------|-------------------|-----------------------|-----------------------|--------------------|
| Q6           | 19.6%           | 37.0%             | 0.0%             | 2.2%              | 30.4%                 | 0%                    | 10.9%              |
| Question (Q) | Less than 1 (%) | 1 to 24 (%)       | 25 to 74 (%)     | 75 to 99 (%)      | 100 to 124 (%)        | 125 to 149 (%)        | 150 to 174 (%)     |
| Q7           | 0.0%            | 2.2%              | 0.0%             | 2.2%              | 0.0%                  | 0.0%                  | 2.2%               |
| Question (Q) | Unsure (%)      | This year (%)     | 2 to 3 years (%) | 4 to 5 years (%)  | More than 6 years (%) | Busy implementing (%) | Mean               |
| Q8           | 10.9%           | 28.3%             | 39.1%            | 2.2%              | 2.2%                  | 17.4%                 | 3.34               |
|              |                 |                   |                  |                   |                       |                       | 1.460              |
|              |                 |                   |                  |                   |                       |                       | 6.5%               |
|              |                 |                   |                  |                   |                       |                       | Standard deviation |
|              |                 |                   |                  |                   |                       |                       | 175 to 200 (%)     |
|              |                 |                   |                  |                   |                       |                       | More than 200      |
|              |                 |                   |                  |                   |                       |                       | 87.0%              |

**Table B-3: Section C: Project and Risk Management**

| Question (Q) | Unsure (%) | Bad (%) | Moderate (%) | Good (%) | Excellent (%) | Missing (%) | Mean | Standard deviation |
|--------------|------------|---------|--------------|----------|---------------|-------------|------|--------------------|
| Q9           | 0.0%       | 4.3%    | 21.7%        | 73.9%    | 0.0%          | 0.0%        | 3.70 | .553               |
| Q10          | 0.0%       | 4.3%    | 30.4%        | 63.0%    | 2.2%          | 0.0%        | 3.63 | .610               |
| Q11          | 2.2%       | 10.9%   | 37.0%        | 43.5%    | 6.5%          | 0.0%        | 3.47 | .786               |
| Q12          | 2.2%       | 8.7%    | 39.1%        | 45.7%    | 4.3%          | 0.0%        | 3.47 | .726               |
| Q13          | 0.0%       | 4.3%    | 37.0%        | 54.3%    | 4.3%          | 0.0%        | 3.59 | .652               |

Annexure B

| Question (Q) | Strongly agree (%) | Disagree (%) | Agree (%) | Strongly agree (%) | Missing (%) | Mean | Standard deviation |
|--------------|--------------------|--------------|-----------|--------------------|-------------|------|--------------------|
| Q14          | 0.0%               | 8.7%         | 65.2%     | 26.1%              | 0.0%        | 3.17 | .570               |
| Q15          | 0.0%               | 2.2%         | 43.5%     | 54.3%              | 0.0%        | 3.52 | .547               |
| Q16          | 0.0%               | 0.0%         | 63.0%     | 37.0%              | 0.0%        | 3.37 | .488               |
| Q17          | 0.0%               | 0.0%         | 56.5%     | 43.5%              | 0.0%        | 3.43 | .501               |
| Q18          | 0.0%               | 2.2%         | 71.7%     | 26.1%              | 0.0%        | 3.24 | .480               |
| Q19          | 0.0%               | 19.6%        | 65.2%     | 15.2%              | 0.0%        | 2.96 | .595               |
| Q20          | 0.0%               | 4.3%         | 63.0%     | 32.6%              | 0.0%        | 3.28 | .544               |
| Q21          | 0.0%               | 0.0%         | 50.0%     | 50.0%              | 0.0%        | 3.50 | .506               |
| Q22          | 0.0%               | 23.9%        | 67.4%     | 8.7%               | 0.0%        | 2.85 | .556               |
| Q23          | 0.0%               | 28.3%        | 65.2%     | 6.5%               | 0.0%        | 2.78 | .554               |
| Q24          | 0.0%               | 17.4%        | 69.6%     | 13.0%              | 0.0%        | 2.96 | .556               |
| Q25          | 0.0%               | 28.3%        | 67.4%     | 4.3%               | 0.0%        | 2.76 | .524               |
| Q26          | 0.0%               | 0.0%         | 54.3%     | 45.7%              | 0.0%        | 3.46 | .504               |
| Q27          | 0.0%               | 26.1%        | 60.9%     | 13.0%              | 0.0%        | 2.87 | .619               |
| Q28          | 2.2%               | 19.6%        | 69.6%     | 8.7%               | 0.0%        | 2.85 | .595               |
| Question (Q) | Unsure (%)         | No (%)       | Yes (%)   | Missing (%)        |             |      |                    |
| Q29          | 10.9%              | 23.9%        | 65.2%     | 0.0%               |             |      |                    |
| Q30          | 4.3%               | 8.7%         | 87.0%     | 0.0%               |             |      |                    |
| Q31          | 2.2%               | 34.8%        | 63.0%     | 0.0%               |             |      |                    |
| Q32          | 19.6%              | 67.4%        | 13.0%     | 0.0%               |             |      |                    |
| Q33          | 47.8%              | 8.7%         | 43.5%     | 0.0%               |             |      |                    |

## Annexure B

| Question (Q) | Valid (%)              | Selected "No" in Q33 |
|--------------|------------------------|----------------------|
| Q34          | 91.3%                  | 8.7%                 |
| Question (Q) | Board of Directors (%) |                      |
| Q35          | 0.0%                   | 2.2%                 |
| Question (Q) | Description            | No (%)               |
| Q36_1        | COBIT                  | 32.6%                |
| Q36_2        | Basel II               | 58.7%                |
| Q36_3        | Prince2                | 39.1%                |
| Q36_4        | SOX                    | 43.5%                |
| Q36_5        | ITIL                   | 26.1%                |
| Q36_6        | PMBOK                  | 50.0%                |
| Q36_7        | ISO Standards          | 21.7%                |
| Question (Q) | Description            | Not at all (%)       |
| Q37_1        | COBIT                  | 34.8%                |
| Q37_2        | Basel II               | 58.7%                |
| Q37_3        | Prince2                | 37.0%                |
| Q37_4        | SOX                    | 43.5%                |
| Q37_5        | ITIL                   | 26.1%                |

# Annexure B

|              |                          |                        |                  |                    |                       |             |                    |                    |
|--------------|--------------------------|------------------------|------------------|--------------------|-----------------------|-------------|--------------------|--------------------|
| Q37_6        | PMBOK                    | 47.8%                  | 13.0%            | 26.1%              | 13.0%                 | 0.0%        | 2.04               | 1.134              |
| Q37_7        | ISO Standards            | 21.7%                  | 21.7%            | 34.8%              | 21.7%                 | 0.0%        | 2.57               | 1.068              |
| Question (Q) | Unsure (%)               | Not used (%)           | Some aspects (%) | Followed (%)       | Strongly followed (%) | Missing (%) | Mean               | Standard deviation |
| Q38          | 8.7%                     | 0.0%                   | 76.1%            | 6.5%               | 6.5%                  | 2.2%        | 3.22               | .571               |
| Question (Q) | Not important at all (%) | A little important (%) | Important (%)    | Very important (%) | Missing (%)           | Mean        | Standard deviation |                    |
| Q39_1        | 0.0%                     | 0.0%                   | 60.9%            | 39.1%              | 0.0%                  | 3.39        | .493               |                    |
| Q39_2        | 0.0%                     | 0.0%                   | 65.2%            | 34.8%              | 0.0%                  | 3.35        | .482               |                    |
| Q39_3        | 0.0%                     | 0.0%                   | 52.2%            | 47.8%              | 0.0%                  | 3.48        | .505               |                    |
| Q39_4        | 0.0%                     | 6.5%                   | 60.9%            | 32.6%              | 0.0%                  | 3.26        | .575               |                    |
| Q39_5        | 0.0%                     | 6.5%                   | 73.9%            | 19.6%              | 0.0%                  | 3.13        | .499               |                    |
| Q39_6        | 0.0%                     | 8.7%                   | 56.5%            | 34.8%              | 0.0%                  | 3.26        | .612               |                    |
| Q39_7        | 0.0%                     | 4.3%                   | 52.2%            | 43.5%              | 0.0%                  | 3.39        | .577               |                    |
| Q39_8        | 0.0%                     | 0.0%                   | 39.1%            | 60.9%              | 0.0%                  | 3.61        | .493               |                    |
| Q39_9        | 0.0%                     | 0.0%                   | 50.0%            | 50.0%              | 0.0%                  | 3.50        | .506               |                    |
| Q39_10       | 0.0%                     | 0.0%                   | 39.1%            | 60.9%              | 0.0%                  | 3.61        | .493               |                    |

## ANNEXURE C: SAMPLE E-MAIL LETTER FOR QUESTIONNAIRES

Mr.....

Fujitsu Services South Africa

The development of a general reference framework for project risk management is currently the subject of an MBA dissertation under my leadership. It is envisaged that the results of the study will contribute towards improvement of efficiency, effectiveness and quality within the project environments of South Africa.

It will require about 15 minutes of your time. All responses will be treated as strictly confidential and participation in the study is voluntary.

---

### ----- Instructions -----

1. *Please complete the attached PDF form named:  
ProjectRiskManagement\_distributed.pdf*
2. *Click the attachment to open the form in Acrobat or Adobe Reader.*
3. *When you are finished, click Submit to return your data to the form author.*

Please note that form needs to be completed using Adobe (not any other open source reader supports the functionality).

---

Your involvement and time set aside is highly appreciated. The results of the study will be made available to you on request.

If you need any assistance, please contact Herbert at 082 566 1539 or [hjvanantwerp@gmail.com](mailto:hjvanantwerp@gmail.com).

Yours sincerely

Herbert van Antwerp