CRITICAL SUCCESS FACTORS FOR THE IMPLEMENTATION OF AN OPERATIONAL RISK MANAGEMENT SYSTEM FOR SOUTH AFRICAN FINANCIAL SERVICES ORGANISATIONS

by

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I declare that Critical Success Factors for the Implementation of an Operational Risk Management System for South African Financial Services is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Signature

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ABSTRACT

Operational risk has become an increasingly important topic within financial institutions of late, resulting in an increased spend by financial service organisations on operational risk management solutions. While this move is positive, evidence has shown that information technology implementations have tended to have low rates of success. Research highlighted that a series of defined critical success factors could reduce the risk of implementation failure. Investigations into the literature revealed that no critical success factors had been defined for the implementation of an operational risk management system.

Through a literature study, a list of 29 critical success factors was identified. To confirm these factors, a questionnaire was developed. The questionnaire was distributed to an identified target audience within the South African financial services community. Reponses to the questionnaire revealed that 27 of the 29 critical success factors were deemed important and critical to the implementation of an operational risk management system.

CHAPTER 1

INTRODUCTION

Operational risk has long been the next frontier in risk management. However, due to its broad scope there has been a variety of approaches to managing operational risk. The global financial crisis, which started in 2008, has shown the dangers of managing various risk types in isolated silos, each with its own champion and culture. As operational risk has matured, organisations are now looking to leverage resources beyond those required for pure compliance purposes and unlock significant operational performance management benefits. Banks are reconsidering how to integrate the full range of risks in an integrated risk management regime. With the introduction of Basel II, the field of operational risk received a boost in terms of the development of tools and strategies, and according to Datamonitor (2008a:6); the following factors have contributed to the importance of operational risk:

- the post-crisis regulatory response will be centred on risk reporting;
- operational risk has broadened from compliance to risk-based performance management;
- operational performance benefits are being unlocked by leveraging operational risk controls and reporting data; and
- Information technology (IT) plays a key role in facilitating operational risk management through process monitoring and the automation of reporting.

1.1 POST-FINANCIAL CRISIS FOCUS ON RISK

> ...The post-crisis market environment, which has given rise to increased governmental, regulatory, and investor activism, continues to exert greater pressure on financial institutions to exhibit sound governance, operational risk, and compliance practices (Ding 2009b:3).

The global financial crisis led to a significant increase in awareness of, and concern about, risk management. Despite millions of Rand being invested in risk systems over the last two decades, failures in risk management were common throughout the financial world.

In most countries across the globe, the global financial crisis showcased the inadequacy of the current financial services industry regulation as well as the industries inability to successfully detect and prevent the risk that was experienced. Some of the most severe losses experienced during the crisis were attributed to operational risk failures.

To understand how financial services organisations were responding to the crisis, research by Ding (2009b:5) into spending for governance, operational risk and compliance (GORC) revealed that increases in GORC spending would reach a compound annual growth rate 6.6 per cent, from US$1.4 billion in 2008 to US$1.7 billion in 2011.

A separate study by Datamonitor (2008b:6) into which areas of GORC would drive IT spend for 2009 and beyond within the retail banking environment revealed operational risk management (ORM) as a top IT spend category across North America, Europe, Japan and Asia Pacific geographies (ORM was also deemed significant in prior Datamonitor studies for 2007 and 2008).

Research by Ding (2009b:12) forecasts the worldwide ORM market to grow to $1.68bn by 2013 at a compound annual growth rate of 6.9 per cent, in line with the view of both Datamonitor (2008b) and Ding (2009b).

Ding (2009b:12) attributes the growth to:

- on-going replacement market, as first-generation ORM systems have proved to be too rigid or not scalable;
- ongoing demand from emerging markets of Asia, Africa and Latin America;
- increased demand in specific vertical segments such as insurance, asset/fund management and broker/dealers;
- convergence of operational risk, enterprise risk management and governance risk and compliance; and
- increased focus on benefits of compliance.

1.2 IT AS A KEY ENABLER

The studies by Datamonitor (2008b:6), Ding (2009b:12) into financial service organisations' IT spending confirm that financial service organisations are indeed focusing IT resources on GORC issues, with Datamonitor (2008b) revealing a particular focus on ORM.

IT implementations are notoriously difficult, costly and time-consuming, and implementing an operational risk management system (ORMS) is no different, and could in fact be more difficult due to the complexity of the application, the extensive business and IT integration needed as well as the adoption of the system throughout the enterprise in order to truly realise business value.

According to IT Cortex (2001), studies conducted over the past 15 years on IT project failure rates indicate that:

- 40 per cent – 80 per cent of IT projects "fail";[1]
- cost implications annually are in the billions of USD; and
- 67 per cent of companies feel their programme/project management practices are "in need of repair".

Figure 1.1 below, adapted from IT Cortex (2001) details failure rates of IT projects from studies conducted over the last 15 years. Refer to Appendix one for further detail.

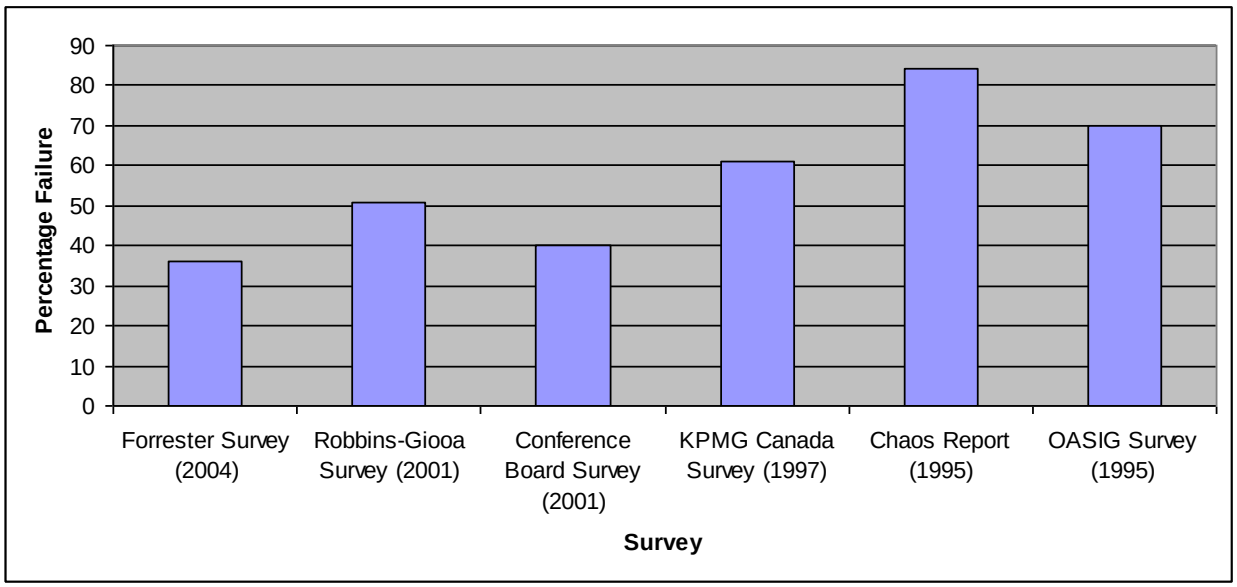

Figure 1.1: IT project failure rate

With such high failure rates across IT implementations, some mechanism is needed to mitigate the risk of failure and to ensure the success of the IT investment in an ORMS. Having a set of well-defined critical success factors (CSF) is one such solution. A thorough understanding of the CSFs related to an ORMS implementation prior to project mobilisation would considerably increase the chances of successful implementation.

However, investigations into the academic literature around the CSFs for implementing an ORMS highlighted a distinct lack of material, and hence exposed a crucial gap in the current academic body of knowledge.

[1] IT project failure will broadly be defined as failing to meet the original scope, expectations, budget and timeline.

With the urgent need to define a comprehensive set of CSFs for an ORMS implementation, a definitive study into the CSFs for ORMS implementations would narrow the academic literature gap as well as provide a sound set of CSFs to assist organisations contemplating an ORMS implementation.

1.3 CONTRIBUTION OF THE STUDY

A successfully implemented ORMS could bring a substantial competitive advantage to an organisation, but high failure rates across IT implementations are a cause for concern. The focus of this study was to investigate the CSFs required throughout an ORMS implementation to ensure successful system implementation.

Understanding the CSFs before embarking on an implementation will provide management with an understanding of key activities and factors to focus on prior to project mobilisation as well as throughout the implementation life cycle, providing a valuable CSF implementation roadmap to avoid common pitfalls and failure points within ORMS implementations.

An initial literature search revealed that current academic literature on the CSFs for ORMS implementations is almost non-existent; however, many researchers have identified or have discussed the critical issues or key success factors in enterprise risk management (ERM), enterprise resource planning (ERP) as well as IT implementations in general. This study therefore attempted to fill the void around ORMS implementation CSFs by defining a common set of CSFs for an ORMS implementation.

The study focused on the South African financial services environment but will be of use to any organisation who wishes to implement an ORMS.

Key groups to benefit from this study will include:

- Finance and risk departments – knowledge of ORMS CSFs will enable the finance and risk department to build a more comprehensive and detailed ORMS implementation roadmap while reviewing the organisation’s current state against the ORMS CSFs to ensure a successful implementation.
- Internal audit – knowledge of ORMS implementation of CSFs will provide a valuable checklist for an auditing team prior to and while performing quality assurance on an ORMS implementation.
- Internal project teams assigned to a risk system implementation – knowledge of ORMS CSFs will allow the internal project team assigned to the implementation to identify implementation risks upfront and be pre-emptive in their detailed implementation planning and throughout the implementation.

- External consulting organisations who specialise in risk system implementation – knowledge of ORMS CSFs would allow for a more thorough analysis of the client based on the ORMS CSFs. This would allow the external consulting organisation to assess the readiness of the organisation for an ORMS implementation more adequately and to identify implementation risks and roadblocks early.

1.4 PROBLEM STATEMENT

Figure 1.1 indicated that IT implementations, in general, have a low probability of being implemented successfully. Increased corporate expenditure and regulatory scrutiny on ORM make it critical that the organisation is able to achieve or at least increase the probability of achieving a successful implementation.

The current academic literature lacks a clear definitive guide on key success factors to ensure a successful ORMS implementation.

This study was therefore undertaken to define a definitive list of CSFs, which lead to a successful ORMS implementation within South African financial services organisations.

1.5 PURPOSE OF STUDY

Operational risk management systems have emerged as a core focus for financial service organisations' IT spending (Datamonitor 2008b:2). The difficulties in IT system implementations have been widely cited in the literature but based on literature studies conducted thus far, a definitive list of ORMS CSFs appears non-existent.

The primary objective of the study was therefore to identify, through a literature review and research survey, the core CSFs to enable a successful ORMS implementation. The study attempted to define a set of CSFs common across all ORMS implementations within a financial services organisation.

1.6 LITERATURE REVIEW APPROACH

It was the aim of this study to explicitly state and document the CSFs needed to achieve successful ORMS implementation.

The literature review focused on providing a detailed analysis and comparison of the current academic literature.

A conceptual analysis approach was adopted for the literature review with the aim of first highlighting all possible references to CSFs determined from the relevant literature. Articles containing reference to CSFs were then analysed in more depth. As suggested by Miles and Huberman (1994:86), this part of the analysis involved differentiating and combining the data collected. Emphasis was placed not on the words themselves but rather on the meaning of the words. Therefore, all CSFs, regardless of description, were noted with the understanding that a subsequent sorting phase would place CSFs into like categories as well as possible sub-factors. An open coding technique was chosen to review and refine the CSFs identified through the literature review.

Open coding, according to Strauss and Corbin (1990:63), is the part of an analysis that pertains specifically to the naming and categorising of phenomena through close examination of data. During open coding, the data is broken down into discrete parts, which are then closely examined and compared for similarities and differences. In addition, questions are asked about the phenomena as reflected in the data. The following steps as defined by Strauss and Corbin (1990:63) were followed in undertaking the CSF literature review:

Step 1: decide the level of analysis. This stage involved deciding whether to search for a single word, a set of words or phrases. The data collection phase of the literature review involved an exhaustive CSF search and focused on four distinct areas of CSF research.

The first review focused on CSFs for general IT implementation success. The articles were searched by title based on the following two criteria:

- the article had to contain either the keyword “success” or “failure” as well as either “critical issues” or “factors”; and
- the article had to contain the term “IT system” or “IT implementation”.

The second part of the literature review focused on CSFs for an ERP implementation. The reason for this was twofold:

- a large amount of academic literature exists around CSFs for an ERP implementation; and
- ERP implementations share similarities with ORMS implementations in that an ERP implementation tends to require a large amount of change within the organisation and are complex to implement.

The articles were searched by title based on the following two criteria:

- they had to contain either the keyword “success” or “failure” as well as either “critical issues” or “factors”; and
- they had to contain the term “enterprise resource planning implementation”.

The third part of the literature review focused on ERM CSFs. ERM provides a framework within which to manage all risk types, including operational risk. Therefore, CSFs identified for an ERM implementation will be closely related to those of an ORMS implementation. The articles were searched by title based on the following two criteria:

- they had to contain either the keyword “success” or “failure” as well as either “critical issues” or “factors”; and
- they had to contain either of the terms “enterprise risk management implementation” or “framework”.

The final focus of the literature review was on ORM. Owing to limited academic literature on ORMS CSFs, the review focused on ORM literature in general in an attempt to ascertain the CSFs required for a successful ORMS implementation. The articles were searched by title based on the following criteria and were restricted to being relevant to the financial services industry:

- they had to contain the keyword “operational risk management”; and
- they had to pertain to the financial services industry.

All articles throughout the literature review were identified through a computer-based search of databases of published works and conference proceedings in the information technology area. In the case where the author(s) published more than one article in the area, only the latest publication was used.

Step 2: decide how many steps to code for. According to Strauss and Corbin (1990:64), this stage of the coding process involves determining whether to code for a specific pre-determined set of concepts or to allow for a more interactive coding approach. It was decided that the more interactive, inductive approach would be most appropriate as it would allow for absolute inclusion of all identified CSFs.

Step 3: decide whether to code for the existence or frequency of a concept. In this stage of the coding process, it was decided to code for the frequency of the concepts. By expanding the process to consider the frequency of concepts across the four study areas, it was possible to gain a better understanding of the relative importance of the factors.

Step 4: decide on how to distinguish among concepts. During this step, it was necessary to decide whether concepts would be coded exactly as they appeared, or whether they could be recorded in some altered or collapsed form. In short, this stage referred to the level of generalisation of terms. Specifically, in this research, any words that implied the same meaning were categorised under the same construct. For example, “adequate budget” and “sufficient budget” have similar meanings and were placed within the same category.

Step 5: develop rules for coding texts. To ensure consistency and thus internal validity when coding, it was necessary to establish a set of translations rules that could be applied throughout the coding process. The following translation rules have been developed and applied:

- all articles were read for the first time and emphasis was placed on noting any reference to a possible “success factor”; and
- all article notes were then re-read in an attempt to determine similarity in concepts, and similar concepts were placed in like categories; and
- each category was then examined, and concepts thoroughly reviewed again to determine whether it was possible to collapse or subdivide and establish any additional categories.

Step 6: code the texts. During this stage, the actual coding process was conducted using a manual technique. All translation rules identified in step five were followed. Strauss and Corbin (1990:65) noted that, with respect to the name attached to the category, that it was usually the one that seemed most logical in relation to the data that it represented.

Step 7: analyse the results. The actual analysis stage involves reviewing the constructs in terms of the evidence provided in the literature.

1.7 EMPIRICAL RESEARCH METHOD AND METHODOLOGY

The purpose of the empirical research was to confirm the CSFs identified through the detailed literature review in context of the South African financial services environment. As such, the literature review created a platform for the CSFs to be analysed and challenged through the empirical research.

The primary research objective of this study was to:

> Determine the critical success factors necessary to enable a successful operational risk management system implementation.

The following approach was used to conduct the empirical research:

- **Questionnaire conceptualisation**

The questionnaire design was based on the consolidated CSFs identified through the detailed literature review. For each CSF, a question assessed both the level of criticality as well as the importance that the CSF had in an ORMS implementation. The questionnaire thus sought to confirm the list of CSFs identified through the literature review.

In general, the questionnaire sought to capture the:

- type of financial service organisation being surveyed;
- respondents' role in the implementation;
- current implementation stage (if applicable);
- importance and criticality of the CSFs defined through the literature review; and
- relative ranking of CSFs.
- Format and data analysis

Having finalised the questionnaire conceptually, focus turned to selecting the appropriate scales of measurement, the questionnaire layout, format, question ordering, font size, etc. specific to the design of the questionnaire. For the scale of measurement, a five-point Likert scale was used, as suggested by Dykema *et al.* (2008:557), in order to measure the significance level of each critical factor. The scale went from "Extremely critical and important" to "Neither critical nor important".

- **Establishing validity**

According to Norland-Tilburg (1990:2), validity can indicate the degree of systematic or built-in error in a measurement. Validity was established using a panel of experts and a pilot test.

Validity was tested in terms of content[2] and sought to answer the following:

- Is the questionnaire valid by measuring what it intended to measure?
- Does the questionnaire represent the content?
- Is the questionnaire appropriate for the sample?
- Is the questionnaire comprehensive enough to collect all the information needed to address the purpose and goals of the study?

[2] Content validity – establishing whether all the important aspects of the construct had been covered (Norland-Tilburg 1990:2).

Addressing these questions coupled with carrying out a readability test enhanced the questionnaire's validity.

Once the pilot study had approved the questionnaire's face and conceptual validity, the next step was to conduct a pilot test using subjects not included in the sample.

- **Establishing reliability**

According to Norland-Tilburg (1990:2), reliability indicates the accuracy or precision of the measuring instrument. The pilot test aimed to confirm whether the questionnaire consistently measured what it was designed to measure. The use of a reliability test such as the split-half reliability[3] test was used as the data was ordinal in nature. The pilot test was conducted on a sample size of seven individuals who would not be included in the final questionnaire sample.

1.8 RESEARCH POPULATION

For the purposes of this research study, the target population for the South African financial services industry comprised of the four largest banks, as well as two additional banks, namely Investec Bank and Rand Merchant Bank (incorporated under the FirstRand Group), as these financial services organisations comprised approximately 90 per cent of the South African banking market (by assets) according to the South African Reserve Bank in 2010 (SARB 2011). The target population included the retail, wholesale and private banking divisions (where applicable) for the above-mentioned banks.

The following groups, who were common to such an IT implementation within a financial services organisation, were considered:

- the organisations IT department;
- internal consultants;
- business end-users, including business sponsors from the areas involved in the implementation; and
- external consultants (system implementers).

[3] Estimation based on the correlation of two equivalent forms of the scale (typically, the Spearman-Brown coefficient)

1.9 CHAPTER OUTLINE

This report is structured into five chapters:

Chapter 1: **Introduction** – Introduction and background to the study

Chapter 2: **Literature review** – Provides a comprehensive CSF literature review of ERM, ERP, IT implementations and ORM.

Chapter 3: **Research design and methodology** – Details the research methodology as well as the design of the questionnaire for the empirical research

Chapter 4: **Data analysis and findings** – Documents the results of the research conducted and examines the results of the initial set of CSFs defined through the literature review

Chapter 5: **Findings and conclusions** – Summary of findings and conclusions

References

Appendix

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

It is the objective of this chapter to give a review of the existing literature and provide an overview of possible ORMS implementation CSFs in general and in the South African financial services industry in particular. The chapter also seeks to show that other researchers have not yet adequately explored the factors to implement an ORMS successfully. At the end of the chapter, a formalised set of CSFs specific to an ORMS implementation is defined. To achieve these objectives, this chapter provides a brief definition of the concepts of risk management and operational risk, and describes the constituents of a typical ORMS.

This chapter is divided into six major sections. Section 2.2 provides an overview of risk management by focusing on ORM as well as on an ORMS. Section 2.3 gives a review of the literature by focus area, with the aim of documenting CSFs cited in the literature. Section 2.4 discusses the logical categories or groupings within which the identified CSFs can be placed, while section 2.5 provides the consolidated list of CSFs identified from the literature review and categorised under the defined factor categories. Finally, the chapter concludes with a detailed review of the defined CSFs in section 2.6, and a closing summary in section 2.7.

Rockart (1979:83) describes a critical success factor as

> … the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organisation … the few key areas where things must go right for the business to flourish.

According to Rockart (1979:86), the process of identifying CSFs helps to ensure that those factors receive the necessary attention.

Cooke-Davies (2002:186) describes success factors as those inputs to the management system that lead directly or indirectly to the success of the project or business. The focus for this study was on a system implementation type project and the CSFs that lead to the successful implementation of that system, more specifically, an operational risk management system.

IT projects are well known for having high failure rates (Randeree & Ninan 2009:30). It is estimated that about one-third of all IT projects either fail or are abandoned, and around 40 per cent of application development projects are cancelled before completion (Randeree & Ninan 2009:30).

According to IT Cortex (2001:7), studies conducted over the past 15 years on IT project failure rates indicate that:

- 40 per cent – 80 per cent of IT projects "fail"[4]
- billions of dollars are lost as a result of project failure; and
- 67 per cent of companies feel their programme/project management practices are "in need of repair".

One of the probable reasons for these results is the large number of areas of expertise that must be managed during the project implementation. Project managers need to grasp technical issues, such as system development and process re-engineering, as well as master the human and organisational aspects, such as change management and end-user involvement. These areas of expertise have been identified by practitioners and researchers and are most commonly referred to as CSFs.

In order to define the CSFs related to the successful implementation of an IT project, a definition of what constitutes IT project success/failure is first needed. Cleland and Ireland (2004:20) note that, since individuals or a group of people who are involved in a project have different needs and expectations; it is very unsurprising that they interpret project success in their own way. Lim and Mohamed (1999:245) note that project success is normally thought of as the accomplishment of some pre-determined project goals while the end user has different views, commonly based on user satisfaction.

The Standish Group (1995:2) defined three project status categories:

- Project success: The project is completed on time and on budget, with all features and functions as initially specified.
- Project challenged: The project is completed and operational but over budget and over the time estimate, and offers fewer features and functions than originally specified.
- Project impaired: The project is cancelled at some point during the development cycle.

The Standish Group (2009:2) identified that 32 per cent of IT projects were considered successful, having been completed on time, on budget and with the required features and functions. Of IT projects, 24 per cent were considered failures, having been cancelled before they were completed, or having been delivered but never used. The rest (44 per cent) were considered challenged meaning that they were either over time or over budget, or completed with fewer than required features and functions.

[4] IT Project failure, as defined by IT Cortex (2001), is the failure to meet original scope, expectations, budget and timeline of the project.

The Standish Group (2009:3) define a successful project as “The ability to complete and operationalise the project, on-time, on-budget, meeting features and functions as specified”.

The study reported here therefore attempted to uncover and explore the relevant CSFs to ensure that an ORMS implementation type project is completed and operationalised on time and on budget and that it meets the features and functions as specified.

To begin to understand the complexities involved in an ORMS, it is important to understand, firstly, enterprise risk management (ERM) and, secondly, operational risk and its management as a sub-component of the ERM framework.

2.2 OVERVIEW OF RISK MANAGEMENT

For all types of organisations, there is a need to understand the risks being taken when seeking to achieve objectives and attain the desired level of reward. The Institute of Risk Management (IRM) notes that an organisation needs to understand the overall level of risk embedded within their processes and activities. It is important for organisations to recognise and prioritise significant risks and to identify the weakest critical controls. A successful ERM initiative can affect the likelihood and consequences of risks materialising, as well as deliver benefits related to better informed strategic decisions, successful delivery of change and increased operational efficiency (IRM 2010:8-14).

The Committee of Sponsoring Organizations of the Treadway Commission (COSO) defines ERM as:

> … a process, effected by an entity's board of directors, management and other personnel, applied in a strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives (COSO 2004:2).

Ding (2009a:8) defines ERM as “a risk management philosophy and approach which adopts a top-down, organisation wide approach to managing the entire universe of risks”. Ding (2009a:9) states that ERM not only covers point risks: like operation risk, credit risk, market risk, legal and compliance risks, but also considers the broader risks like strategic, reputational, political, environmental and key people risks.

Risk management is a process that is underpinned by a set of principles. It also needs to be supported by a structure that is appropriate to the organisation and its external environment or context. A successful risk management initiative should be proportionate to the level of risk in the organisation (as related to the size, nature and complexity of the organisation), aligned with other corporate activities, comprehensive in its scope, embedded in routine activities and dynamic by being responsive to changing circumstances (IRM 2010:12).

Globally, there are a number of models or frameworks for describing and implementing an ERM framework within an organisation; IRM (2010) references the following:

- Australian and New Zealand Risk Management Standard (AS/NZS) 4360:2004, which provides a generic guide for managing risk. It may be applied to a wide range of activities or operations of any public, private or community enterprise, or group (IRM 2010:16).
- British Standard 31100, which is a code of practice for risk management published by the British Standards International, establishing principles and terminology for risk management, and offering recommendations for the model, framework, process and implementation of a risk management system (IRM 2010:16).
- International Standard Organisation (ISO) 31000 Risk Management, which comprises guidelines on principles and implementation of risk management. ISO 31000 pulls together and replaces a number of similar international standards and supersedes national standards such as the AS/NZS 4360:2004 (IRM 2010:16).
- COSO ERM framework, which provides a generic enterprise risk management framework (IRM 2010:16).

Figure 2.1 below is a representation of a generic ERM framework based on the ISO 31000 standard. It highlights the key risks and focus areas of a generic ERM framework while illustrating the framework’s continuous life cycle of risk assessment, risk treatment and then monitoring the identified risks.

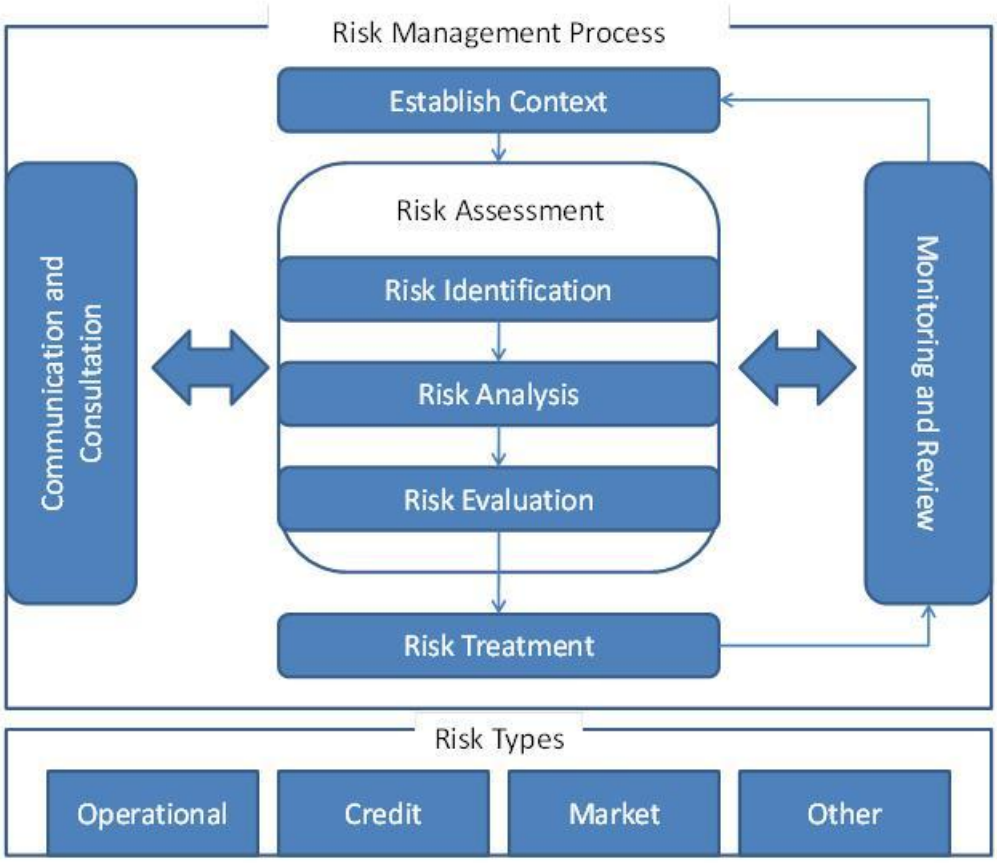

Figure 2.1: Generic risk management process (based on ISO 31000)

The core components of Figure 2.1 are discussed in more detail below:

- **Risk assessment (Risk identification, analysis and evaluation)**

Risk identification establishes the exposure of the organisation to risk and uncertainty. This will include knowledge of the factors critical to success and the threats and opportunities related to the achievement of objectives (IRM 2010:16).

The risk analysis and evaluation activity assists the effective and efficient operation of the organisation by identifying those risks that require attention by management. This will facilitate the ability to prioritise risk control actions in terms of their potential to benefit the organisation (IRM 2010:16).

- **Risk treatment**

Risk treatment is the activity of selecting and implementing appropriate control measures to modify the risk. Risk treatment includes, as its major element, risk control (or mitigation), but extends further to, for example, risk avoidance, risk transfer and risk financing (IRM 2010:17).

- **Feedback mechanisms**

Monitoring and review ensure that the organisation monitors risk performance and learns from past experience. Communication and consultation are also considered to be part of the supporting framework (IRM 2010:18).

With operational risk being considered as a key component of the ERM landscape, it is understandable that the management of operational risk follows a similar approach. In today's complex financial services industry, the task of managing operational risk is usually supported by the use of an operational risk management system that automates and manages much of the operational risk-related workflow of the framework outlined above.

2.2.1 Operational risk management

Considering the many risks faced by a business, operational risk can be viewed as a central point at which other risks interface with the business and, if mismanaged, can lead to significant losses.

The Basel Committee for Banking Supervision (BCBS) defines operational risk to be "the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events" (BCBS 2001:2). Explicitly excluded from this definition are systemic risks, strategic and reputational risks, as well as all indirect losses or opportunity costs. The BCBS (2004) states that operational risk is inherent in every business and support activities, in other words, operational risk can occur anywhere and anytime in any business environment.

Ding (2006b:4) provides the following examples of common operational risk vulnerabilities across financial services organisations:

Asset/fund management

- control breaches and deviations from standard practices in late trading/market timing scandals; and
- misaligned compensation systems for sales staff resulting in conflicts of interest between employees, client and organisation.

Retail banking/corporate banking

- internal and external fraud in payment and wire transfers;
- inappropriate segregation of duties for loan administration; and
- money laundering and know-your-customer procedures.

Investment banking

- management and sales of sophisticated financial products; and
- conflict of interest issues between research, brokerage and advisory activities.

Securities/brokerage

- failure to question above-market returns;
- weaknesses in the infrastructure supporting sales and risk monitoring of credit default swaps; and
- high trading volume growth in over the counter derivatives resulting in significant backlogs in confirmation.

Risk management

- operational design and data inaccuracies in sophisticated risk models;
- incorrect interpretations and judgment calls on model results; and
- inconsistent capture and valuation of collateral information.

Information technology

- information security breaches resulting in second-order breaches such as cyber attacks, identity thefts, exposure of customer confidentiality, etc.; and
- operating risks from third party outsourcing and off shoring activities.

Finance

- risks associated with fragmented use of spreadsheets in capturing and manipulation of data in financial reporting.

Allen (2003:22) notes that operational risk events can be divided into high frequency/low severity events that occur regularly. Each event individually exposes the firm to low levels of losses. In contrast, low frequency/high severity operational risk events are quite rare, but the losses to the organisation are significant.

In June 2006, the BCBS released the International Convergence of Capital Measurement and Capital Standards, which contained the definitive proposals on capital charges for operational risk under Basel II (BCBS 2004). The Basel Committee however backed away from dictating explicit methodologies for calculating operational risk capital charges towards a more qualitative approach to the management of operational risk. In their final proposals, the Basel Committee stressed the importance of qualitative standards for banks that prefer to use the advanced measurement approach (AMA) for management of their operational risks. The Basel Committee, however, states that an ORM system must be "conceptually sound and implemented with integrity" (BCBS 2004:3), but gives little guidance as to what such a system might actually look like.

To qualify for using the AMA approach to calculate operational risk capital under Basel II, a bank must meet stringent qualitative standards and as such should have (BCBS 2006:150):

- an independent operational risk management function;
- an operational risk measurement system that is closely integrated into the day-to-day risk management processes of the bank;
- regular reporting of operational risk exposures to business units, senior management and the Board, with procedures for appropriate action;
- the operational risk management system must be well documented;
- regular reviews of the operational risk management processes/systems by internal and/or external auditors; and
- validation of the operational risk measurement system by external auditors and/or supervisory authorities, in particular, making sure that data flows and processes are transparent and accessible.

Along with the qualitative standards, the BCBS (2006:151) identifies the following quantitative standards, according to which the bank must:

- demonstrate that its operational risk measure meets a soundness standard comparable to that of the internal ratings-based approach for credit risk (i.e. comparable to a one-year holding period and a 99.9^{th}-percentile confidence interval);
- have and maintain rigorous procedures for operational risk model development and independent model validation;
- have a risk measurement system aligned with the loss event types;
- calculate regulatory capital as the sum of expected losses and unexpected losses;

- be sufficiently “granular” to capture the major drivers of operational risk affecting the shape of the tail of the loss estimates;
- include the use of internal data, relevant external data, scenario analysis and factors reflecting the business environment and internal control systems;
- include the use of internal data, relevant external data, scenario analysis and factors reflecting the business environment and internal control systems; and
- use a credible, transparent, well-documented and verifiable approach for weighting these fundamental elements in its overall operational risk measurement system.

Over the last few years, in order to support financial institutions in meeting their Basel II regulatory requirements, along with the automation of the ORM process, operational risk management systems have become increasingly sophisticated and important tools (Ding 2009b:7). The next section provides an overview of the main components of an operational risk management system.

2.2.2 Operational risk management system

Operational risk management system is a broad term used to describe software designed for the management and monitoring of operational risk within an organisation. Gartner (2009) defines an operational risk management system as a combination of two primary technologies, namely operational risk engines (OREs) and qualitative risk self-assessments (QRSAs).

- An ORE, as defined by Gartner (2009:56), is:

> … a tool for the measurement of potential loss that is due to the inadequate management of operations. It supports event reporting, calculates the risk capital (economic and regulatory) to be allocated to operational risk, runs scenarios against operational risk exposures (such as value at risk, loss frequency, loss severity or loss from a given event) to quantify operational risk, fits statistical distributions to internal and external loss data, links cause and effect to determine key risk indicators, conducts fault tree analysis, and creates qualitative rankings and balanced scorecards for operational risk.

- A QRSA, as defined by Gartner (2009:64), is:

> … a software application that provides the ability to identify operational risk exposures, and then links controls, risks, audit findings and losses to those exposures. QRSA tools focus on qualitative, process-based management of operational risk and typically support risk policy definition and controls, including an organisational framework; business process identification; and mapping, evaluation, audit and certification functions. Information related to loss events and key risk indicators are captured and reported and escalated through workflow functionality to the appropriate level of management for regulatory reporting.

For the purposes of this study, OREs and QRSAs shall cumulatively be referred to as an operational risk management system (ORMS).

An ORMS is a complex mixture of qualitative and quantitative capabilities and functions. To ensure that the intended benefits are realised upon implementation, a thorough understanding of the factors necessary to implement a successful ORMS is required. To identify the possible CSFs necessary for an ORMS implementation, a review of the available academic literature follows in the section below.

2.3 CRITICAL SUCCESS FACTOR LITERATURE REVIEW

To define a concise set of CSFs relevant to an ORMS implementation, an understanding of the general CSFs relevant to all IT projects is first needed. As indicated in the introduction to this chapter, IT projects tend to have high rates of failure. This in turn has led to numerous academic studies and research to uncover exactly which factors are the most important and critical to the success of the implementation process. A high-level review of the relevant academic literature on IT project CSFs follows. A more detailed review of the factors is covered in section 2.6 at the end of this chapter.

In a study by Fortune and White (2006), 63 project management publications were reviewed and analysed. The publications encompassed theoretical and empirical studies of successful and unsuccessful projects. Fortune and White (2006:55-56) consequently identify 25 distinct CSFs:

- clear realistic objectives
- strong business case/sound basis for project
- effective monitoring/control
- planned close down/review/acceptance of possible failure
- competent project manager
- strong/detailed plan kept up to date
- good leadership
- correct choice/past experience of project management methodology/tools
- skilled/suitably qualified/sufficient staff/team
- good communication/feedback
- political stability
- environmental influences
- past experience (learning from)
- organisational adaptation/culture/structure

- project size/level of complexity/number of people involved/duration
- adequate budget
- sufficient/well-allocated resources
- training provision
- proven/familiar technology
- good performance by suppliers/contractors/consultants
- risks addressed/assessed/managed
- user/client involvement
- different viewpoints (appreciating these)
- project sponsor/champion
- effective change management

In a separate study, Dorsey (2000:3-12) focused exclusively on system project failures. Dorsey (2000) raises the following additional CSFs specific to IT system implementations:

- methodology: where the development and implementation methodology needs to be thoroughly thought out and documented before commencing with a project;
- data model: a well-constructed and thought-out data model is core to any system implementation; and
- data migration: failing to assess and plan adequately for data migration.

The Standish Group's Chaos Report (1995:2-9) surveyed IT executive managers for their opinions about why projects succeed. The three greatest failure points are cited as:

- lack of user involvement;
- lack of executive management support; and
- lack of clear statement of requirements

The Standish Group (1995) further identified the following CSFs:

- smaller project milestones; and
- realistic expectations.

A report by research group Gartner (2005) into users' view of why IT projects fail cites deficiencies in organisational change management as a CSF and states, "project success requires business leadership and change management methods operated by competent people" (Gartner 2005:7).

The review of the literature on IT project CSFs identifies several success factors common across all types of IT projects. To define the set of CSFs further, large complex IT projects and their associated CSFs are examined in the subsequent section. Due to the availability of research on the topic, ERP implementations are used as a proxy for a large complex IT project.

According to Kalbasi (2007:14), an ERP system is a packaged software system that enables a company to manage the efficient and effective use of resources (materials, human resources, finance, etc.) by providing a total, integrated solution for its information processing needs. Bagchi, Kanungo and Dasgupta (2003:143) state that ERP implementations are generally large complex enterprise-wide IT implementations and that at their core is a single comprehensive database, which supports the various ERP modules and functions. Bagchi *et al.* (2003:145) also state that ERP implementations typically influence the entire organisation with a high degree of business process re-engineering.

In a study to assess an ERPs CSFs, Kalbasi (2007:23-34) conducted a case study comparison between a successful ERP implementation and an unsuccessful one. The identified CSFs for successful implementation were:

- worked with functionality;
- maintained scope;
- project team;
- management support;
- consultants;
- internal readiness;
- training;
- planning; and
- adequate testing.

Umble, Haft and Umble (2003:241-257), in their study of ERP implementation of CSFs, identify nine factors for implementing a successful ERP project:

- clear understanding of strategic goals;
- commitment by top management;

- excellent project management;
- organisational change management;
- good implementation team;
- data accuracy;
- extensive education and training;
- focused performance measures; and
- multi-site issues.

Nah, Zuckweiler and Lau (2003:5-22), identify ten CSFs as being critical to the successful implementation of an ERP system:

- responsibility assigned (via a project manager);
- empower decision-makers;
- have targeted and effective communication;
- encourage communication among stakeholders;
- communicate expectations at all levels;
- communicate project progress;
- accept user input;
- have full-time team members;
- clearly established project scope; and
- apply appropriate business and information technology legacy systems.

Holland and Light (2000:2-7) identify two main groups of CSFs for ERP implementations:

- Strategic
    - legacy systems
    - business vision
    - ERP strategy
    - top management support
    - project schedule/plans

- Tactical
    - client consultation
    - personnel
    - business process change and software configuration
    - client acceptance
    - monitoring and feedback
    - communication
    - trouble shooting

Grabski and Leech (2007) conducted a study that was motivated by a lack of theoretically grounded empirical research into the risk factors and control procedures that are critical for the successful implementation of ERP systems. The factors identified by Grabski and Leech (2007) are similar to CSF categories or groupings, and the controls that have been defined by Grabski and Leech (2007) can be considered as individual CSFs. Based on this logic, Grabski and Leech (2007:17-39) identify the following CSF categories with associated CSFs:

- Project management
    - specified measures of success
    - project team structure
    - setting up of a project steering committee
- Change management
    - end-user training
    - adequately skilled consultants
    - project team experience
- Alignment of the business with the new system
- Internal audit activities
    - internal audit control throughout implementation
- Consultant and planning activities
    - over-reliance on consultants

Somers and Nelson (2001:2-10) propose a comprehensive list of 22 CSFs associated with project/system implementations, which they derived through a process of identification and synthesis of critical requirements for implementations recommended by practitioners through an extensive review of the literature:

- top management support
- project champion
- user training and education
- management of expectations
- vendor/customer partnerships
- use of vendor's development tools
- careful selection of the appropriate package
- project management
- steering committee
- use of consultants
- minimal customisation
- data analysis and conversion
- business process re-engineering
- defining the architecture
- dedicated resources
- project team competence
- change management
- clear goals and objectives
- education on new business processes
- interdepartmental communication
- interdepartmental cooperation
- ongoing vendor support

Gargeya and Brady (2005:2-16) aimed to investigate and analyse common circumstances that occur within most ERP projects, and to determine the areas that are key to success versus those that contribute to failure. In their research, they identified six common factors that are indicative of successful or non-successful ERP implementations:

- working with functionality/maintained scope
- project team/management support/consultants
- internal readiness/training
- dealing with organisational diversity
- planning/development/budgeting
- adequate testing

Fawaz, Al-Salti and Eldabi (2008) set out with the research aim of identifying the most cited ERP CSFs in the literature in order to gain a better understanding and a clearer picture of the factors that are considered to be vital for successful ERP implementation. Fawaz *et al.* (2008:2-9) identify the following CSFs:

- top management support
- business plan and vision
- re-engineering business processes
- effective project management and project champion
- teamwork and composition
- ERP system selection
- user involvement
- education and training

Doom, Milis, Poelmans and Bloemen (2009:378-406) examined the CSFs of ERP implementations in Belgian small to medium enterprises with the aim of identifying those success factors that were specific to a small to medium enterprise environment. The following CSFs were found to be of significance:

- a clear vision of the strategic goals of the ERP implementation
- senior management support
- active user involvement

- a suitable corporate culture that is open to change
- internal communication on the ERP project, both before and during the project
- proper management of the ERP supplier
- a formalised project approach and methodology
- a focus on user requirements
- use of external consultants
- user training, both on technical aspects and on business aspects, oriented towards practice
- proper project planning, phasing and follow-up
- proper project management
- a project team, composed of a mix of users, i.e. internal, technical and business
- experts and external consultants

Francoise, Bourgault and Pellerin (2009:371-394) attempted to identify practical activities that were essential for managing ERP implementation projects and identified the following CSFs:

- project teamwork and composition
- organisational culture and change management
- top management support
- business plan and long-term vision
- business process re-engineering (BPR) and customisation
- effective communication
- project management
- software development, testing and troubleshooting
- monitoring and evaluation of performance
- project champion
- organisational structure
- end-user involvement

Finney and Corbett (2007:329-347), in their attempt to explore and define a common set of CSFs for ERP implementations, identified the following:

- top management commitment and support

- change management
- business process reengineering and software configuration
- training and job redesign
- project team: the best and brightest
- implementation strategy and timeframe
- consultant selection and relationship
- visioning and planning
- balanced team
- project champion
- communication plan
- IT infrastructure
- managing cultural change
- post-implementation evaluation
- selection of ERP
- team morale and motivation
- project management
- troubleshooting/crisis management
- legacy system consideration
- data conversion and integrity
- system testing
- client consultation
- project cost planning and management
- building a business case
- empowered decision-makers

The literature review of CSFs for ERP implementations, confirmed several of the previously identified factors (e.g. clear realistic goals and objectives and project sponsor/champion from top management). Additional CSFs focused around large enterprise-wide implementations were also identified (e.g. a clear implementation strategy and a cross-functional team consisting of a mix of consultants and internal staff).

To begin to understand CSFs more specific to an ORMS implementation, the focus of the review then shifted to understanding CSFs relevant to risk implementations.

As outlined in the introduction to this chapter, ERM is a framework under which the universe of risks affecting a business can be managed. With operational risk being one of the larger risk types covered by the ERM framework (Branson *et al.* 2007:118), an understanding of the success factors surrounding the implementation of an ERM framework would provide useful insight into CSFs relevant for ORMS implementations.

Branson *et al.* (2007:122) discuss the challenges and issues facing ERM, and define the following key ERM CSFs:

- cross-functional team consisting of a mix of consultants and internal staff
- full-time team members
- project sponsor/champion from top management as critical to the success of an ERM implementation

A study by Payne (2010:2-15) identified the following ERM-centric CSFs:

- linking output to management strategy
- enterprise strategy
- defining risk appetite and tolerance
- well-defined and documented processes and procedures
- risk methodology/framework
- measurement of the system
- clearly defined roles and responsibilities throughout the organisation
- Chief risk officer required to drive change

Payne (2010:2-15) also stresses the importance of the following CSFs:

- clear realistic goals and objectives
- clear implementation strategy
- enterprise-wide implementation
- project size/level of complexity/number of people involved/duration
- effective monitoring/control throughout the implementation life cycle
- project sponsor/champion from top management

- active top management support throughout the implementation life cycle
- top management setting policies to establish new system
- user/client involvement
- effective change management
- training provision (budget, resources)
- end-user training
- internal audit control throughout implementation

Following an analysis into the top 12 ERP implementation challenges, Schanfield (2008:41-44) identifies the following contributing CSFs:

- compensation and incentives
- active top management support throughout the implementation life cycle
- effective change management
- internal audit control throughout implementation

A survey regarding risk management systems in the aftermath of the 2008 global financial crisis by the Global Association of Risk Professionals (GARP) (2010:2-18) identifies the following success factors:

- common understanding of risk strategy between the business and IT
- IT involvement in pre-project planning
- enterprise-wide implementation
- data migration, data consolidation and data cleaning

During a study by Na Ranong and Phuenngam (2009:29-45) into the CSFs for effective risk management procedures in financial industries, the following CSFs relevant to an ERM implementation were defined:

- commitment and support from top management
- communication
- information technology
- culture
- organisational structure
- training

The literature review into the CSFs for the implementation of an ERM framework revealed several similarities to the IT and ERP implementation studies. Factors such as having a competent project manager, effective change management as well as having targeted and effective communication were cited several times indicating the importance of such factors. The literature review also revealed several specific factors not identified in the previous general IT and ERP literature reviews. Factors such as defined and documented organisational structure, a common understanding of the risk strategy between businesses and IT, and a defined risk tolerance and appetite were identified as being unique to ERM implementation.

With the review of the literature surrounding ERM implementations complete, the remainder of the literature review focused on operational risk, and was broadened to include articles around operational risk from an IT perspective, in order to determine any specific CSFs.

A research paper by Ding (2006a:5-34) identified the following key factors in the success of implementing an ORMS:

- data model
- smaller project milestones (through an incremental approach in piloting the development and rollout of the operational risk programme)
- common understanding of risk strategy between the business and IT
- clear implementation strategy
- project sponsor/champion from top management
- user/client involvement
- defining flexible and configurable architectural framework
- combined quantitative and qualitative operational risk approach
- business unit involvement early in the planning

Datamonitor (2008a:5-32) identified the following success factors:

- well-defined and documented processes and procedures
- IT involvement in pre-project planning
- business unit involvement in early planning
- user/client involvement
- data availability, data migration, data consolidation and data cleaning
- data model
- interfaces with legacy systems and other applications

- internal audit control throughout implementation

Janakiraman (2008:26-41) conducted a survey to determine the state of preparedness and challenges in developing an ORM framework for Indian banks. The survey was conducted across twenty-two Indian banks and indicated the following CSFs as impediments in the implementation of ORM:

- insufficient internal data
- difficulties in collection of external loss data
- modelling complexities

A Gartner (2009:15) research report identified data availability as a key success factor in an ORMS Implementation. Gartner (2009:8-66) identifies the following key factors for organisations to consider when implementing an ORMS:

- data model
- minimal customisation to the software
- flexible and configurable architectural framework and data availability
- data migration, data consolidation and data cleaning

An article by Young (2008:1-14) to identify the main role-players involved in the management of operational risk in a banking environment provides support for the following already identified factors:

- top management to set policies to establish new systems
- well-defined and documented operational risk management policies, processes and procedures
- clearly defined roles and responsibilities throughout the organisation (operational risk-related)
- defined and documented organisational structure
- internal audit control throughout implementation

The review of the operational risk-related material revealed no additional CSFs. Factors such as user/client involvement throughout the implementation process as well as data availability, migration, consolidation and cleaning seem common across most literature studies. Encouragingly, there is a high degree of overlap between the review for ERM and ORMS, with many of the factors being cited several times (e.g. business unit and IT involvement in pre-project planning, data model as well as flexible and configurable architectural framework).

Through the literature review, a total of 60 CSFs were identified. Table 2.1 in the next section, lists all 60 identified CSFs as well as a reference back to the area of the literature review in which the particular CSF is identified.

2.3.1 Consolidated critical success factors

The literature review revealed a variety of factors across the literature review focus areas of general IT project implementations, ERP implementations, ERM implementations and operational risk with several of the CSFs identified in one or more of the focus areas.

Table 2.1 below contains a consolidated list of all 60 identified CSFs along with their corresponding focus area reference and literature source.

Table 2.1: Identified literature review critical success factors

ID	CSF	CSF literature review focus area				References
		IT project	ERP	ERM	OR	
1	Linking output to management compensation			X		Payne (2010)
2	Top management setting policies to establish new system		X	X	X	Kalbasi (2007) Payne (2010) Young (2008)
3	Define risk appetite and tolerance			X	X	Payne (2010) Ding and Behera (2009) Young (2008)
4	Well-defined and documented operational risk management policies, processes and procedures			X	X	Payne (2010 Datamonitor (2008a) Young (2008)
5	Common understanding of risk strategy between business and IT			X	X	GARP (2010) Ding (2006a)
6	Sound system implementation methodology	X				Dorsey (2000)
7	Clear realistic goals and objectives	X	X	X		Fortune and White (2006) Nah *et al.* (2003) Grabski and Leech (2007) Somers and Nelson (2001) Payne (2010) Fawaz *et al.* (2008) Doom *et al.* (2009) Francoise *et al.* (2009)

ID	CSF	CSF literature review focus area				References
		IT project	ERP	ERM	OR	
8	Strong business case/sound basis for the project	X	X			Fortune and White (2006) Kalbasi (2007) Nah *et al.* (2003) Holland and Light (2000)
9	Clear and fixed statement of requirements	X	X			The Standish Group (1995) Grabski and LeechGrabski and Leech (2007)
10	Smaller project milestones	X				The Standish Group (1995)
11	Clear implementation strategy		X	X	X	Holland and Light (2000) Kalbasi (2007) Payne (2010) Ding (2006a) Doom *et al.* (2009)
12	Proven/familiar technology	X				Fortune and White (2006)
13	IT involvement in pre-project planning			X	X	GARP (2010) Datamonitor (2008a)
14	Business unit involvement in early planning				X	Ding (2006a) Datamonitor (2008a)
15	Enterprise-wide			X		Ding (2009a) Branson *et al*. (2007) Payne (2010) GARP (2010) Ding and Behera (2009)
16	Clearly established project scope		X			Nah *et al.* (2003) Somers and Nelson (2001) Doom *et al.* (2009)
17	Adequate budget	X				Fortune and White (2006)
18	Skilled/suitably qualified/sufficient staff/team	X				Fortune and White (2006)
19	Cross-functional team consisting of a mix of consultants and internal staff		X	X		Kalbasi (2007) Branson *et al*. (2007)
20	Team should have both business and technical knowledge		X			Kalbasi (2007) Nah *et al.* (2003) Grabski and LeechGrabski and Leech (2007)
21	Adequate compensation and incentives		X	X		Kalbasi (2007) Nah *et al.* (2003) Schanfield (2008)
22	Making use of adequately skilled consultants		X			Grabski and LeechGrabski and Leech (2007) Somers and Nelson (2001)

ID	CSF	CSF literature review focus area				References
		IT project	ERP	ERM	OR	
23	Full-time team members		X	X		Nah *et al.* (2003) Grabski and LeechGrabski and Leech (2007) Somers and Nelson (2001) Branson *et al*. (2007)
24	Experienced project team	X	X			Fortune and White (2006) Grabski and LeechGrabski and Leech (2007) Somers and Nelson (2001) Fawaz *et al.* (2008)
25	Responsibility assigned		X			Nah *et al.* (2003) Finney and Corbett (2007)
26	Competent project manager	X	X	X		Fortune and White (2006) Grabski and LeechGrabski and Leech (2007) Finney and Corbett (2007) Francoise *et al.* (2009)
27	Strong/detailed plan kept up to date throughout the implementation life cycle	X	X			Fortune and White (2006) Holland and Light (2000) Grabski and LeechGrabski and Leech (2007) Finney and Corbett (2007)
28	Risks addressed/assessed/managed	X	X			Fortune and White (2006) Grabski and LeechGrabski and Leech (2007)
29	Maintaining initial project scope		X			Kalbasi (2007)
30	Effective monitoring/control throughout the implementation life cycle	X	X	X		Fortune and White (2006) Nah *et al.* (2003) Holland and Light (2000) Payne (2010) Doom *et al.* (2009) Francoise *et al.* (2009) Finney and Corbett (2007)
31	Specified measures of success		X			Grabski and LeechGrabski and Leech (2007)
32	CRO required to drive change			X		Payne (2010)

ID	CSF	CSF literature review focus area				References
		IT project	ERP	ERM	OR	
33	Project sponsor/champion from top management	X	X	X	X	Fortune and White (2006) Nah *et al*. (2003) Grabski and LeechGrabski and Leech (2007) Somers and Nelson (2001) Branson *et al*. (2007) Payne (2010) Ding (2006a) Fung (2006) Fawaz *et al.* (2008) Doom *et al.* (2009) Francoise *et al.* (2009) Finney and Corbett (2007)
34	Active top management support throughout the implementation life cycle		X	X		Kalbasi (2007) Nah *et al*. (2003) Holland and Light (2000) Grabski and LeechGrabski and Leech (2007) Somers and Nelson (2001) Payne (2010) Schanfield (2008) Na Ranong and Phuenngam (2009) Doom *et al.* (2009) Finney and Corbett (2007)
35	Empowered decision-makers		X		X	Nah *et al.* (2003)
36	Documented and agreed project team structure		X			Grabski and LeechGrabski and Leech (2007) Kalbasi (2007) Francoise *et al.* (2009) Young (2008)
37	Creation of a project steering committee		X			Grabski and LeechGrabski and Leech (2007) Somers and Nelson (2001)
38	Clearly defined roles and responsibilities throughout the organisation (operational risk-related)			X	X	Payne (2010) Na Ranong and Phuenngam (2009) Young (2008)
39	Defined and documented organisational structure				X	Young (2008) Francoise *et al.* (2009) Fung (2006)
40	User/client involvement	X	X	X	X	Fortune and White (2006) Fawaz *et al.* (2008) Doom *et al.* (2009) Francoise *et al.* (2009)

ID	CSF	CSF literature review focus area				References
		IT project	ERP	ERM	OR	
41	Effective change management	X	X	X		Fortune and White (2006) Nah *et al.* (2003) Holland and Light (2000) Payne (2010) Ding (2006a) Datamonitor (2008a) Doom *et al.* (2009) Francoise *et al.* (2009)
42	Training provision (budget, resources)	X	X	X		Fortune and White (2006) Nah *et al.* (2003) Grabski and LeechGrabski and Leech (2007) Somers and Nelson (2001) Gartner (2005) Kalbasi (2007) Payne (2010) Schanfield (2008) Na Ranong and Phuenngam (2009) Finney and Corbett (2007)
43	End-user training		X	X		Fortune and White (2006) Kalbasi (2007) Payne (2010) Fawaz *et al.* (2008) Doom *et al.* (2009) Finney and Corbett (2007)
44	Management of expectations at all levels	X	X			The Standish Group (1995) Somers and Nelson (2001) Nah *et al.* (2003)
45	Targeted and effective communication	X	X	X		Fortune and White (2006) Nah *et al.* (2003) Holland and Light (2000) Na Ranong and Phuenngam (2009) Doom *et al.* (2009) Finney and Corbett (2007)
46	Communication among key stakeholders		X			Nah *et al.* (2003) Grabski and LeechGrabski and Leech (2007) Somers and Nelson (2001)
47	Project progress communication		X			Nah *et al.* (2003) Grabski and Leech (2007)
48	End-user input		X			Nah *et al.* (2003) Grabski and Leech (2007) Francoise *et al.* (2009)
49	Political stability	X				Fortune and White (2006)

ID	CSF	CSF literature review focus area				References
		IT project	ERP	ERM	OR	
50	Environmental influences	X				Fortune and White (2006)
51	Organisational adaptation/culture/structure	X	X		X	Fortune and White (2006) Kalbasi (2007) Nah *et al.* (2003) Holland and Light (2000) Francoise *et al.* (2009)
52	Data availability, data migration, data consolidation and data cleaning	X	X	X	X	Dorsey (2000) Kalbasi (2007) Somers and Nelson (2001) GARP (2010) Ding and Behera (2009) McKibben and Furlonger (2009) Doom *et al.* (2009) Finney and Corbett (2007)
53	Data model	X		X	X	Dorsey (2000) Ding and Behera (2009) Ding (2006a) Datamonitor (2008a) McKibben and Furlonger (2009)
54	Minimal customisation to the software		X		X	Kalbasi (2007) Nah *et al.* (2003) Somers and Nelson (2001) McKibben and Furlonger (2009) Francoise *et al.* (2009) Finney and Corbett (2007)
55	Interfaces with legacy systems and other applications		X		X	Kalbasi (2007) Nah *et al.* (2003) Holland and Light (2000) Datamonitor (2008a) Finney and Corbett (2007)
56	System testing prior to implementation		X			Kalbasi (2007) Nah *et al.* (2003) Grabski and Leech (2007) Francoise *et al.* (2009) Finney and Corbett (2007)
57	Vendor support and past experience		X	X		Kalbasi (2007) Somers and Nelson (2001)
58	Aligning the business processes to the software or vice versa		X	X		Kalbasi (2007) Nah *et al.* (2003) Holland and Light (2000) Somers and Nelson (2001) Francoise *et al.* (2009)

ID	CSF	CSF literature review focus area				References
		IT project	ERP	ERM	OR	
59	Flexible and configurable architectural framework		X	X	X	Somers and Nelson (2001) Ding and Behera (2009) Ding (2006a) Datamonitor (2008a) McKibben and Furlonger (2009) Doom *et al.* (2009) Finney and Corbett (2007)
60	Internal audit control throughout implementation		X	X	X	Grabski and Leech (2007) Payne (2010) Schanfield (2008) Datamonitor (2008a) Young (2008) Fernandez-Laviada (2007)

With a total of 60 identified CSFs, a mechanism to group and classify the CSFs logically would allow for a simplification and rationalisation for better analysis. Section 2.4 defines the mechanism to rationalise and categorise the identified CSFs.

2.4 CRITICAL SUCCESS FACTORS CATEGORISATION

To rationalise the 60 identified CSFs it was necessary to decide whether the concepts would be coded exactly as they appeared, or whether they could be recorded in some altered or collapsed form. Specifically, in this research, any CSF that implied the same meaning could be included under the same construct as a sub-factor. For example, “Linking output to management compensation” and “Adequate compensation and incentives” has a similar meaning so “Linking output to management compensation” was placed as a sub-factor under the CSF “Adequate compensation and incentives”. This approach had the benefit of consolidating the 60 identified CSFs down to 29 CSFs. Table 2.2 below documents the mapping of the CSFs to associated sub-factors.

Table 2.2: Critical success factor sub-factors

Original CSF	Original CSF listed as a sub-factor under the CSF:
Linking output to management compensation	Adequate compensation and incentives
Policies set by top management to establish new system	Active top management support throughout the implementation life cycle
Sound system implementation methodology	Clear implementation strategy

Original CSF	Original CSF listed as a sub-factor under the CSF:
Strong business case/sound basis for the project	Clear realistic goals and objectives
Clear and fixed statement of requirements	Clearly established project scope
Smaller project milestones	Clearly established project scope
Proven/familiar technology	Documented assumption
Business unit involvement in early planning	Merged with IT involvement in pre-project planning to form Business unit and IT involvement in pre-project planning
Skilled/suitably qualified/sufficient staff/team	Experienced and adequately skilled project team
Team should have both business and technical knowledge	Experienced and adequately skilled project team
Adequate compensation and incentives	Adequate budget
Making use of adequately skilled consultants	Experienced and adequately skilled project team
Strong/detailed plan kept up to date throughout the implementation life cycle	Effective monitoring/control throughout the implementation life cycle
Risks addressed/assessed/managed	Effective monitoring/control throughout the implementation life cycle
Maintaining initial project scope	Incorporated under “Effective monitoring/control throughout the implementation life cycle”
CRO required to drive change	Project sponsor/champion from top management
Active top management support throughout the implementation life cycle	Project sponsor/champion from top management
Empowered decision-makers	Project sponsor/champion from top management
Creation of a project steering committee	Documented and agreed project team structure
Clearly defined roles and responsibilities throughout the organisation (operational risk-related)	Documented and agreed project team structure
User/client involvement	Effective change management
Training provision (budget, resources)	Effective change management
End-user training	Effective change management
Management of expectations at all levels	Targeted and effective communication
Communication among key stakeholders	Targeted and effective communication

Original CSF	Original CSF listed as a sub-factor under the CSF:
Project progress communication	Targeted and effective communication
End-user input	User/client involvement
Political stability	Considered not part of a CSF review for an ORMS implementation
Environmental influences	Considered not part of a CSF review for an ORMS implementation
Organisational adaptation/culture/structure	Targeted and effective communication
Aligning the business processes to the software or vice versa	Minimal customisation to the software

A total of 31 of the 60 defined CSFs can be considered as sub-factors of another CSF. Having rationalised the original 60 CSFs, a final list of 29 CSFs and their associated sub-factors can be defined. To provide structure and to simplify the CSF listing further, logical categories or groups can be created that contain factors that are conceptually related. Section 2.5 outlines these categories.

2.5 CATEGORIES OF CRITICAL SUCCESS FACTORS

To add further structure to the identified CSFs, a series of categories were identified.

Strauss and Corbin (1990:66) state that with respect to the naming of a category, “it is usually the one that seems most logically related to the data it represents, and it should be graphic enough to remind you quickly of its referent”. As such, the categories in Table 2.3 are noted for their common reference and relation to the identified list of CSFs.

Table 2.3: Critical success factor categories

Category name	Category description
Strategy	All CSFs related to the support of the strategic direction of the system implementation project
Pre-project planning	All CSFs related to the pre-project planning phase of a system implementation project
Scope	All CSFs that relate to the scope of a system implementation project. The Project Management Institute (PMI) defines scope as “the work that must be performed to deliver a product, service, or result with the specified features and functions” (PMI 2008:444).
Project resources	All CSFs that relate to the project resources who are involved with a system implementation project

Category name	Category description
Project management	All CSFs that are related to the project management of the system implementation project. The PMI defines project management as the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements
Performance monitoring	All CSFs that are related to the performance monitoring of a system implementation project. The PMI defines performance monitoring as those processes required to track, review and regulate the progress and performance of the project, identifying any areas in which changes to the plan are required, and initiate the corresponding changes.
Decision-makers' support from senior management	All CSF that are related to the key stakeholders and decision-makers involved with a system implementation project
Governance	All CSFs related to the governance of a system implementation project
Change management	All CSFs that are involved with the change management effort throughout the organisation undergoing a system implementation project
Communication	All CSFs related to both the internal and external communication between all stakeholders involved in the system implementation project
Data	All CSFs related to the application data required for a system implementation project
Application	All CSFs related to the application being implemented as part of the system implementation project
Architecture	All CSFs related to the solution architecture for the system being implemented
Internal audit	All CSFs related to internal audit's role within a system implementation project

Table 2.4 below consolidates the CSFs identified in Table 2.1 under the CSF categories defined in Table 2.3. Sub-factors identified in Table 2.2 above have been highlighted through indentation under their corresponding CSF.

Table 2.4: Categorised critical success factors

ID	CSF Category	CSF (with associated sub-factors)
1	**Strategy**	
1.1		Common understanding of risk strategy between business and IT
1.2		Define risk appetite and tolerance
1.3		Well-defined and documented operational risk management policies,

ID	CSF Category	CSF (with associated sub-factors)
		processes and procedures
2	**Pre-project planning**	
2.1		Clear realistic goals and objectives
2.2		Clear implementation strategy
2.3		Business unit and IT involvement in pre-project planning
		Business unit involvement in early planning
3	**Scope**	
3.1		Clearly established project scope
		Clear and fixed statement of requirements
		Smaller project milestones
3.2		Enterprise-wide implementation
4	**Project resources**	
4.1		Adequate budget
		Adequate compensation and incentives
		Linking output to management compensation
4.2		Cross-functional team consisting of a mix of consultants and internal staff
4.3		Full-time team members
4.4		Experienced and adequately skilled project team
		Team should have both business and technical knowledge
5	**Project management**	
5.1		Responsibility assigned
5.2		Competent project manager
6	**Performance monitoring**	
6.1		Effective monitoring/control throughout the implementation life cycle
		Strong/detailed plan kept up to date throughout the implementation life cycle
		Risks addressed/assessed/managed

ID	CSF Category	CSF (with associated sub-factors)
		Maintaining initial project scope
6.2		Specified measures of success
7	**Decision-makers' support from senior management**	
7.1		Project sponsor/champion from top management
		CRO required to drive change
		Active top management support throughout the implementation life cycle
		Empowered decision-makers
8	**Governance**	
8.1		Documented and agreed project team structure
		Creation of a project steering committee
		Clearly defined roles and responsibilities throughout the organisation (operational risk-related)
8.2		Defined and documented organisational structure
9	**Change management**	
9.1		Effective change management
		User/client involvement
		Training provision (budget, resources)
		End-user training
10	**Communication**	
10.1		Targeted and effective communication
		Management of expectations at all levels
		Communication among key stakeholders
		Project progress communication
		Organisational adaptation/culture/structure
11	**Data**	
11.1		Data availability, migration, consolidation and cleaning

ID	CSF Category	CSF (with associated sub-factors)
11.2		Data model
12	**Application**	
12.1		Minimal customisation to the software
		Aligning the business processes to the software (align business processes to application, or customise application to align with existing business processes)
12.2		Interfaces with legacy systems and other applications
12.3		System testing prior to implementation
12.4		Vendor support and past experience
13	**Architecture**	
13.1		Flexible and configurable architectural framework
14	**Internal audit**	
14.1		Internal audit control throughout implementation

With a defined and categorised set of 29 CSFs relevant for an ORMS implementation, Section 2.6 focuses on examining each of the defined CSFs in more detail.

2.6 CRITICAL SUCCESS FACTOR REVIEW

Section 2.6 presents an academic review of the literature around each of the 29 identified CSFs. The review has been structured around the categories identified in Section 2.5 above and focuses on the CSFs outlined in Table 2.4 above.

2.6.1 Strategy

Factor 1: Common understanding of risk strategy between business and IT

A survey conducted by (GARP 2010:14) regarding the technology which risk managers were using or planning to acquire, how often they updated results, and the role of the front and back office in risk management, revealed that business takes the lead in identifying and providing solutions for risk management in 78 per cent of the responses. Only 32 per cent of risk managers thought that business executives were up to date with technology and strategy. Another 52 per cent said they were somewhat aware, while 16 per cent said they were not aware at all.

This gap between business and IT persists when it comes to planning, where it was found that 49 per cent said that there was only some understanding of what is required for risk management in the years ahead, and another 20 per cent said that there was not a reasonable understanding between the business side and IT (GARP 2010:15).

Factor 2: Define risk appetite and tolerance

Ding and Behera (2009:25) comment that having defined a risk strategy, the organisation then needs to understand and align its risk appetite with the strategy. Ding and Behera (2009:26) emphasise that; "an organisation's risk appetite must incorporate the expectations and constraints of various external stakeholders and must be managed so as not to breach the risk appetite that has been set".

Young (2008:40) identifies that the Chief Executive Officer, in cooperation with senior executive management, has the responsibility to ensure that all components of risk management are in place, which generally includes setting broad-based policies and developing the organisation's risk appetite and culture.

Payne (2010:10) found that, as part of the ERM strategy and policy, an organisation must set its risk appetite and tolerance levels. Measuring performance against risk appetite will provide the board and executive committee with the ability to make better informed decisions of whether more or less risk should be taken, and changes in alignment with the ERM and organisational strategies may be monitored.

Factor 3: Well-defined and documented operational risk management policies, processes and procedures

Payne (2010) identified the need to develop a risk management policy that outlines the key value drivers in order to assist in the implementation of an ERM framework and achieve the desired level of detail. Payne (2010:34) states,

> … ERM policies, processes and systems must be consistent throughout the organisation to prevent apathy and rejection of ERM. Top management and the board must be familiar with and committed to such policies and processes to ensure leadership by example.

The ERM policy must enable risk management and other personnel to understand what the organisation intends to accomplish with ERM. The ERM strategy informs the ERM policy, which in turn facilitates achievement of the ERM strategy.

Payne (2010:35) notes that typically the ERM policy should:

- define enterprise risk management detailing its fit and purpose within the organisation;
- articulate the ERM objectives, risk appetite and tolerance and what the organisation sets to achieve through implementing ERM;
- list and describe the required roles and responsibilities for the implementation of ERM and management of risks;
- guide management and ERM personnel toward achieving specific ERM goals and meeting expected requirements for complying with specific ERM regulations;
- provide the structure and direction for the remaining components of the framework, specific ERM processes, the organisational structure of ERM, the system to be used for information management, reporting requirements and processes, and other ERM methodologies;
- define the nature and levels of performance measurement that will take place, including the evaluation of internal controls; and
- increase awareness of ERM throughout all levels in the organisation and clarify the board and executives' understanding of ERM and the impact it may have on the organisation.

Young (2008:42) summarises the roles and responsibilities of business management as having to ensure the execution and implementation of risk management policies by developing detailed risk management procedures.

2.6.2 Pre-project planning

Factor 4: Clear realistic goals and objectives

The Project Management Institute (PMI) defines projects as "a means of achieving organisational goals and objectives, often in the context of a strategic plan" (PMI 2008:15).

> Projects and project management take place in an environment that is broader than that of the project itself. Understanding this broader context helps ensure that work is carried out in alignment with the goals of the enterprise and managed in accordance with the established practice methodologies of the organisation (PMI 2008:15).

Payne (2010:11) notes that it is important to set out key goals and objectives that need to be achieved in order to give purpose to the vision and mission. Payne (2010:11) further notes that specific strategic actions then need to be developed against these key goals and objectives and that these actions should be measurable, achievable and have resources and timeframes allocated.

Ang, Sum and Chung (1995:65) identify clear goals and objectives as the third most critical success factor in a study of ERP implementations. Slevin and Pinto (1987:32) state, “the initial phase of any project should begin with a conceptualisation of the goals and possible ways to accomplish these goals”.

Ross (1999, cited in Nah *et al.* 2003) found that clearly communicated goals helped companies achieve continuous improvement in (ERP) implementations. Nah *et al.* (2003:7) note that attaining the stated goals or benefits is important to sustain organisational commitment to the ERP implementation and that a clear business plan and vision are needed to steer the direction of the implementation and that such goals should be clearly defined and well-understood (Shanks *et al.* 2000, cited in Nah *et al.* 2003). Fawaz *et al.* (2008:26) state that a clear business plan and vision was needed to guide the project throughout the ERP life cycle and that goals should be specific and operational to indicate the general direction of the project. Fawaz *et al.* (2008) found that one of the biggest problems ERP project leaders face come not from the implementation itself, but from expectations of board members, senior staff, and other key stakeholders. It is thus important to set the goals of the project before even seeking top management support. Doom *et al.* (2009:382) state that the goals should be realistic in terms of required quality, time and money.

Factor 5: Clear implementation strategy

Holland and Light (2000:12) note that the implementation strategy is concerned with the broad approach to the implementation process. Holland and Light (2000:14) cite the example of having a skeleton version implemented initially with extra functionality added gradually once the system is operating and the users are familiar it. This approach is then contrasted against the ambitious strategy of implementing full functionality in a single effort. It is further highlighted that a decision on the implementation strategy is needed prior to considering issues around how the project should be managed.

Gargeya and Brady (2005:506) determine that the approach for the implementation is another very important consideration and that there was no evidence in their research that any one way of implementation is better than another as a whole, but rather should be dealt with on a case-by-case basis.

Factor 6: Business unit and IT involvement in pre-project planning

The GARP (2010:17) survey found that, although risk management had a high degree of dependency on IT, the relationship between the managers and IT was not as close as it could be.

Only forty-three per cent of the organisations in the GARP (2010:17) study reported that IT was involved in business planning for risk management from the beginning, but another 41 per cent said there was only some involvement by IT in the business planning, and 36 per cent said IT was not brought in until after the plans had been completed. Datamonitor (2008a:8) found that organisations that had taken a strategic approach to risk, whether through existing awareness or learning through the process of implementing an operational risk framework, had found an inevitable convergence of the traditionally separate roles of risk, operations and IT. Ding (2006) notes that it is important to secure business unit involvement early in planning efforts as well as to obtain internal consensus first on business requirements from various divisions and lines of business.

2.6.3 Scope

Factor 7: Clearly established project scope

The PMI (2008) defines project scope as “The work that needs to be accomplished to deliver a product, service, or result with the specified features and functions” (PMI 2008:103).

Holland, Light and Gibson (1999) as well as Shanks, Parr, Hu, Corbitt, Thanasankit and Seddon (2000) (cited in Nah *et al.* 2003:16) point out that the scope of the project in terms of the amount of system implementation, involvement of business units, and business process re-engineering needed, should be clearly established and controlled. Nah *et al.* (2003:17) indicate that establishing the programme scope is critical to a successful ERP implementation and that the project must be formally defined in terms of its milestones or clear delivery dates (Holland *et al*. 1999, cited in Nah *et al*. 2003). Realistic milestones and end dates should be set (Murray & Coffin 2001; Shanks *et al*. 2000, cited in Nah *et al.* 2003:18). Timeliness of the project should be enforced and escalation of issues and conflicts should be managed (Rosario 2000, cited in Nah *et al*. 2003:18).

Somers and Nelson (2001:15) note that proper management of scope is critical to avoid schedule and cost overruns on a project, and that project scope that is too broad or ambitious could cause severe problems. Doom, Millis, Poelmans and Bloemen (2009:391) found that the project scope includes the identification of the business processes affected by the ERP implementation, the choice of ERP modules and the identification of the changes to the standard software package.

Sub-factor: Clear statement of requirements

The PMI (2008:105) defines requirements as the stakeholders needs to meet the project objectives, and states,

> The project's success is directly influenced by the care taken in capturing and managing project requirements. Requirements include the quantified and documented needs and expectations of the sponsor, customer, and other stakeholders. These requirements need to be elicited, analyzed, and recorded in enough detail to be measured once project execution begins. Collecting requirements is defining and managing customer expectations.

Davenport (2000:14) found that detailed requirements specification for ERP software selection increase the probability that the ERP system would meet the organisation's requirements and support the newly redesigned operational processes. The detailed requirement specifications force the organisation to identify, in advance, the project scope and understand the level of complexity associated with the project.

Factor 8: Enterprise-wide implementation

GARP (2010:16) highlights:

> … leading edge adoption of the latest technology has often resulted in legacy silos. While this could be an embarrassment in retail banking or wealth management firms, it could be a disaster in risk management. It is for this reason that the scope of an ERM implementation should be firm-wide and cover all lines of business.

Ding (2009a:12) suggests that an organisational response across all stages of the regulatory compliance life cycle is needed when considering ORMS implementation.

2.6.4 Project resources

Factor 9: Cross-functional team consisting of a mix of consultants and internal staff

Kalbasi (2007:44) found that it is critical to build a cross-functional team. Summer (1999, cited in Kalbasi 2007) states that the team should have a mix of consultants and internal staff so that the internal staff can develop the necessary technical skills for design and implementation. Grabski and Leech (2007:18) found that an organisation, however, cannot completely rely on consultants to implement an ERP system, as consultants have limited specific knowledge of the organisation's detailed operations. Thus, a close working relationship between consultants and the organisation's project team could lead to a valuable skill transfer (Bowen 1998, cited in Kalbasi 2007:45).

Somers and Nelson (2001:17) found that many organisations use consultants to facilitate the implementation process and that these consultants generally have experience in specific industries with comprehensive knowledge about certain modules.

Factor 10: Adequate budget

Sub-factor: Adequate compensation and incentives

Wee (2000, cited in Kalbasi 2007:47) found that the team should be given compensation and incentives for successfully implementing the system on time and within the assigned budget. Nah *et al.* (2003:26) add that team members' compensation should be tied to project performance.

Factor 11: Full-time team members

Wee (2000, cited in Kalbasi 2007:49) remark that team members need to be assigned full time to the implementation.

Shanks *et al*. (2000, cited in Nah *et al*. 2003:16) add that the release of business experts with relevant knowledge onto the project on a full-time basis is very important and that it is critical for the project team and consultants to be assigned to the project on a full-time basis to ensure they focus completely on the project (Grabski & Leech 2007:26).

Somers and Nelson (2001:32) found that full-time dedicated resources are critical in order to realise the benefits associated with an implementation and that resource requirements need to be determined early in the project as they often exceed initial estimates.

Factor 12: Experienced and adequately skilled project team

Grabski and Leech (2007:35) found that a lack of project team expertise is often associated with software development risk. In a survey cited in Nah *et al*. (2003:39) by Jiang *et al*. (1996), it was found that having competent members in the project team is the fourth most important success factor for IT implementations. Both business and technical knowledge are essential for success (Bingi *et al.* 1999; Sumner 1999, cited in Nah *et al*. 2003:36). Grabski and Leech (2007:32) identify that knowledge; skills, abilities, and experience in both technical and business aspects are all critical factors in determining a project's success or failure. Doom *et al.* (2009:12) note that attention should be paid to the composition of the project team which should contain both business and technical team members.

2.6.5 Project management

Factor 13: Responsibility assigned

Rosario (2000, cited in Nah *et al.* 2003:18) asserts that an individual or group of people should be given responsibility to drive success in project management. Doom *et al.* (2009:394) mention that project team empowerment is of critical importance and that giving project teams the necessary decision power will improve the project implementation.

Francoise *et al.* (2009:386) found that at the head of the team, the project manager should have adequate authority and become involved with the project as soon as possible, as must the company's management. Francoise *et al.* (2009:387) found that management should be directly involved in supporting the team and transferring authority and responsibility.

Factor 14: Competent project manager

PMI (2008:26) states:

> Project managers are assigned by the performing organisation to achieve the project objectives. A project manager must be able to understand project detail, but manage from the overall project perspective. As the person responsible for the success of the project, a project manager is in charge of all aspects of the project. The project manager is the lead person responsible for communicating with all stakeholders, particularly the project sponsor, project team, and other key stakeholders.

Project managers must grasp technical issues such as system development and process re-engineering. However, they must also master the human and organisational domains such as change management and end-user involvement.

Jiang *et al*. (1996, cited in Nah *et al.* 2003:14) found that a competent project manager is the second most important factor in IT implementations. Grabski and Leech (2007:38) found that a project manager is able to break down a complex project into small manageable parts and associated deliverables against which team members can be evaluated. The project manager is also the team leader and is responsible for the development of the team spirit, and can develop individual team members' skills in such a fashion that the result is the development of self-control within those team members.

Francoise *et al.* (2009:391) found that a project calls on numerous different groups to take part and presents a high level of uncertainty, thus depending on solid project management knowledge. The presence of skills related to planning, organisation, follow-up and control over the project phases are vital. The project manager must be able to head up the project and recognise and overcome difficulties.

Thus, Kumar *et al*. (2003, cited in Francoise *et al.* 2009:392) indicate that the manager's project management capacities are the number one criterion for selecting this person, even more than experience, role in the organisation or initiation of the project.

2.6.6 Performance monitoring

Factor 15: Effective monitoring/control throughout the implementation life cycle

Monitoring and feedback is the exchange of information amongst members of the project team and the analysis of feedback from organisation users. Monitoring and feedback are essential to ensure that the project is progressing as planned in technical and organisational terms particularly given the mix of internal and external staff working on the project and the resulting relationships (Holland & Light 2000:19).

Francoise *et al*. (2009:386) noted that, in order to be able to pilot the project, one must put indicators in place that will allow for adequate visibility. In that sense, it is essential to define a monitoring plan from the outset. Each objective must be reflected in one or more indicators that are updated regularly and are associated with an adequate correction of disparities. Francoise *et al*. (2009) found that the monitoring processes facilitate communication with management and allow for true transparency.

Grabski and Leech (2007:23) found that, in order to retain control over the project, many organisations develop a detailed system implementation plan that provides direction for the project team by setting out the project goals and targets. Holland and Light (2000:31) note that the project schedule/plan is the formal definition of the project in terms of milestones and critical paths and that it provides a clear view as to the boundary of the project. Nah *et al.* (2003:16) recognise that the milestones and targets identified, need to be actively monitored throughout the project life cycle in order to track the progress of the project.

Factor 16: Specified measures of success

The objectives for a project provide the overall guidance for the upfront planning that translates into the future vision for the organisation, and the steps needed to accomplish the ERP implementation. This should also result in specified measures of success that can be used to evaluate the outcome of the ERP implementation. The requirements provide the checklist as to what needs to be accomplished and what needs to be embodied in the ERP software itself, and the implementation plan provides the actual steps to be performed. The project team and project manager should then be evaluated against these outcomes (Grabski & Leech 2007:38).

Berchet and Habchi (2005, cited in Francoise *et al*. 2009:376) insist on the importance of developing effective, measurable indicators to ensure good project follow-up, but do not go so far as to suggest what these factors might be.

2.6.7 Decision-makers' support from senior management

Factor 17: Project sponsor/champion from top management

Top management support is identified by many researchers as one of the key success factors for an IT implementation. The roles of top management in IT implementations as defined by McKersie and Walton (1990, cited in Somers & Nelson 2001:19) include developing an understanding of the capabilities and limitations of IT, establishing reasonable goals for IT systems, exhibiting strong commitment to the successful introduction of IT, and communicating the corporate IT strategy to all employees.

McKersie and Walton (1990, cited in Somers & Nelson 2001:17) also found that the success of technological innovations is often linked to the presence of a champion who performs the crucial functions of transformational leadership, facilitation and marketing of the project to the users. Positioning the champion high in the organisation, however, is associated with the authority to move large and complicated projects through the implementation life cycle.

Payne (2010:8) found that buy-in from top management and the board is critical and that without their support and the setting of a good example from the highest level, an ERM implementation would be little more than an administrative process driven by the risk management team.

Rosario (2000, cited in Nah *et al.* 2003:18) found that a project sponsor's commitment is critical to drive consensus and to oversee the entire life cycle of the ERP implementation. Falkowski *et al.* (1998, cited in Nah *et al.* 2003:18) indicate that the project champion should be a high-level executive sponsor who has the power to set goals and legitimise change. Rogers (1995, cited in Nah *et al.* 2003) also emphasises the importance of a project champion to drive success and notes that, for costly, visible, or radical projects, the champion needs to be a powerful individual with a high office in the organisation.

Bingi *et al.* (1999), Davenport (2000) and Holland and Light (1999) (cited in Grabski & Leech, 2007:27) found that through the appointment of an executive-level individual with extensive knowledge of the organisation's operational processes as the project sponsor, senior management is better able to monitor the ERP implementation.

Bingi *et al*. (1999, cited in Nah *et al.* 2003:13) found that the attitude of top management to the project determines the amount of resources allocated to the implementation project and that in large implementations, top management support is even more important since top management advocacy and support provide a symbol of enterprise priority.

For risk specific implementations, Payne (2010:9) identifies that a Chief Risk Officer is required, at an appropriately senior level, to monitor the organisation's overall risk profile in order to ensure that major risks are identified, measured and reported in order to maintain the risk management framework and infrastructure. Young (2008) found that the support of senior management is important for effective risk management and that their awareness and commitment could be influenced by (Young 2008:7):

- obtaining the active and on-going support of the organisation's directors and senior executives for risk management and for the development and implementation of the risk management policy and plan;
- appointing a senior manager to lead and sponsor risk management initiatives; and
- obtaining the commitment and support of all senior managers for the execution of the risk management plan.

Na Ranong and Phuenngam (2009:47) found that the support of senior management is a critical factor in the success of a risk implementation and that top management support includes a broad range of activities in an organisation, including developing project procedures that include the initiation stage, training programmes, establishing a project management office and support quality management.

Fawaz *et al.* (2008:25) found that top management support in ERP implementations has two main aspects: providing leadership and providing the necessary resources (Zhang *et al*. 2002, cited in Fawaz *et al.* 2008:25). Additionally, the role of top management in an ERP implementation comprise of developing an understanding of the capabilities and limitations, establishing reasonable objectives for the ERP system, exhibiting commitment, and communicating the corporate strategy to all employees (Umble *et al*. 2003, cited in Fawaz *et al.* 2008:25). Fawaz *et al.* (2008:26) further found that top management support should not end with initiation and facilitation, but needs to extend to the full implementation of an ERP system, providing direction to the implementation teams and monitoring the progress of the project.

Francoise *et al.* (2009:379) identify the project champion as playing a key role in the project and state:

> Ideally there should be only one champion, who may be accompanied by one or more other sponsors in very large jobsites. This person must obligatorily be a member of top management, which will allow him or her to give the project appropriate support. The project champion is essential to the implementation. Through his or her investment and persuasion, the champion facilitates team motivation and helps to create enthusiasm and convergence on common goals.

2.6.8 Governance

Factor 18: Documented and agreed project team structure

Young (2008:1) states it is "of the utmost importance to understand the concept of operational risk management and, more specifically, the actual roles and responsibilities of various role-players within an organisation". Francoise *et al*. (2009:386) identify the need to document all members' roles, authorities, responsibilities and competencies formally.

Sub-factor: Creation of a project steering committee

Davenport (2000) and Whitten and Bentley (1998, cited in Grabski & Leech 2007:37) found that a steering committee enables senior management to directly monitor the project team and control project escalation. The steering committee can monitor the decisions made by the project team and retain ratification and approval rights on all significant decisions, which ensure that adequate controls over the project team's decision-making processes exist.

Grabski and Leech (2007:39) also found that the steering committee could hold the project manager and project team accountable for the completion of explicit tasks at specific times and review whether this has occurred. Chimni (2000, cited in Somers & Nelson 2001:24) determines that a project management structure with a steering committee consisting of senior management from across different corporate functions, project management representatives, and end-users who have frequent contact with the implementation, is an effective means of ensuring appropriate involvement. Finney and Corbett (2007:333) found that steering committee members should be involved in vendor selection, monitoring during implementation and management of outside consultants.

Factor 19: Defined and documented organisational structure

Stank, Daugherty and Gustin (1994, cited in Na Ranong & Phuenngam 2009:292) believe that an organisational structure involves an organisation's internal pattern of relationships, authority and communication and that this structure comprises of formal lines of authority and communication which serve to allocate tasks and resources and provide a means of coordination.

Young (2008:35) states:

> … in order for the risk management process to be effective it is imperative to establish a clearly defined risk management structure. However, a process on its own is of no use to an organisation without the supporting component of an organisational structure and the governance of the process.

Fung (2006:39) adds that operational risk should be managed as a partnership of business units, business infrastructure groups, and corporate governance units such as internal audit and risk management.

Francoise *et al.* (2009:373) state that an audit of the organisational structure plays an important role, especially in the earliest days of the implementation and that it is necessary for the main project's stakeholders to initiate a thorough reflection about the changes the system may require and/or bring about from an organisational perspective.

2.6.9 Change management

Factor 20: Effective change management

According to Francoise *et al.* (2009:374):

> … every company has a culture, which may or may not be strong and enduring, and which may be reflected in either openness to change or the opposite. Change must be recognized as an integral part of business process development, especially by the people with the most seniority.

Aladwani (2001, cited in Nah *et al.* 2003:7) identifies that the changes caused by an implementation within an organisation directly relate to the human cost element, or human psyche. If people are not ready or willing to change, change simply will not occur. Aladwani (2001, cited in Nah *et al.* 2003:7) also found that all managers must be charged with the responsibility of controlling worker anxiety and resistance to the system implementation. Roberts and Barrar (1992, cited in Nah *et al.* 2003:9) found that management should have a strong commitment to use the system for achieving business aims and that users must be trained, and concerns must be addressed through regular communication, working with change agents, leveraging corporate culture and identifying job aids for different users. Falkowski *et al*. (1998, cited in Nah *et al.* 2003:11) point out that the stronger the need for change, the more likely it is that top management and stakeholders will support the implementation.

Bingi *et al*. (1999) and Holland *et al.* (1999, cited in Kalbasi 2007:48) found that, as part of the change management efforts, users should be involved in the design and implementation of business processes and the system, and that formal education and training should be provided.

Sub-factor: Training

Wilder and Davis (1998, cited in Somers & Nelson 2001:24) found that a lack of user training and failure to understand fully how enterprise applications change business processes frequently appears to be responsible for problem implementations and failures.

Fill and Mullins (1990, cited in Na Ranong & Phuenngam 2009:16) found that the process of staff development and training should fulfil an organisation's performance and that the purpose of training is to improve knowledge, skills and attitudes, which in turn increases confidence, motivation and job satisfaction.

The main reason for an education and training programme is not only to ensure that members are comfortable with the system, but also to increase their expertise and knowledge (Fill & Mullins 1990, cited in Na Ranong & Phuenngam 2009:17). Na Ranong and Phuenngam (2009:19) found that training not only makes use of the new system being implemented, but also of new processes attached to such implementation, which in turn leads to an increase in the employees' understanding of the integration within the system and how the work of one employee influences the work of others.

Davenport (1998:31) found that at a minimum, everyone who uses a new system needs to be trained on how he or she uses the new system and how the system influences the existing business process early on in the implementation process. Davenport (1998:31) suggests that, although many companies use consultants to help during the implementation process, it is important that knowledge be transferred from the consultant to internal employees.

Gargeya and Brady (2005:512) found that the people element and training aspect of an implementation have historically received the least amount of attention with little regard and financial support.

Wee (2000, cited in Kalbasi 2007:49) states that employees need training in order to understand how the system will change the business processes and that it is important to have extra training and on-site support for staff as well as managers during the implementation.

Sub-factor: User/Client involvement

Best (1997, cited in Grabski & Leech 2007:28) found that involving users in the project enables the project team to be aware of users' requirements and it also addresses users' concerns. User involvement in the design and implementation of new business processes and the system is recommended along with formal education and training to help users understand how the system will impact their jobs (Bingi *et al*. 1999; Holland *et al*. 1999; Roberts & Barrar 1992; Shanks *et al*. 2000, cited in Nah *et al.* 2003:17).

Holland and Light (2000:16) recognise the importance of involving users in the design and implementation of business processes that include formal education and training. Holland and Light (2000:17) identify that the process of client consultation aims to generate buy-in to the project and system in order to ensure that it will meet business needs and facilitate client acceptance of the system later in the implementation process.

Fawaz *et al.* (2008:25) found that user involvement is one of the most cited critical success factors in the ERP implementation projects. Through their research, Fawaz *et al.* (2008:25) found that user involvement increases user satisfaction and acceptance by developing realistic expectations about system capabilities.

Francoise *et al.* (2009:389) found that beyond training, it is important to get users involved during the development of the system and to make use of their knowledge in areas where the team lacks expertise. It is also necessary to be transparent with the users concerning the real contributions the system would make.

2.6.10 Communication

Factor 21: Targeted and effective communication

PMI (2008:438) defines project communications as:

> … the processes required to track, review, and regulate the progress and performance of the project; identify any areas in which changes to the plan are required; and initiate the corresponding changes … The processes required ensure timely and appropriate generation, collection, distribution, storage, retrieval, and ultimate disposition of project information. This continuous monitoring provides the project team insight into the health of the project and identifies any areas requiring additional.

Communication includes the formal promotion of project teams and the announcement of project progress to the rest of the organisation (Holland *et al*. 1999, cited in Nah *et al.* 2003:20). Falkowski *et al*. (1998) and Wee (2000, cited in Nah *et al.* (2003:20) found that expectations or goals at every level need to be communicated throughout the implementation life cycle.

Grabowski and Roberts (1999, cited in Na Ranong & Phuenngam 2009:18) determined that communication plays an important role in risk mitigation, as it provides opportunities for clarification, for making sense of the organisation's progress, and for members to discuss how to improve the organisation and the impact of using different risk mitigation strategies. Grabowski and Roberts (1999, cited in Na Ranong & Phuenngam 2009:19) also found that the communication process provides opportunities for members to understand their roles and responsibilities as the structure of the organisation changes.

Sub-factor: Communication among key stakeholders

The PMI (2008:23) defines stakeholders as:

> Stakeholders are persons or organisations (e.g. customers, sponsors, the performing organisation, or the public), who are actively involved in the project or whose interests may be positively or negatively affected by the performance or completion of the project. Stakeholders may also exert influence over the project, its deliverables, and the project team members. The project management team must identify both internal and external stakeholders in order to determine the project requirements and expectations of all parties involved.

Schwalbe (2000, cited in Somers & Nelson 2001:40) states that communication is the oil that keeps everything working properly. Through their research, Somers and Nelson (2001:41) identified communication as a key component of a successful project implementation and that communication is essential across the project team as well as throughout the organisation.

Appleton (1999, cited in Grabski & Leech 2007:39) found that the managerial skills of communication and team building are among the most important skills required for a successful ERP implementation.

Sub-factor: Management of expectations

The PMI (2008:262) defines the management of stakeholder expectations as the "process of communicating and working with stakeholders to meet their needs and addressing issues as they occur". PMI (2008:262) also states:

> … managing expectations helps to increase the probability of project success by ensuring that the stakeholders understand the project benefits and risks. This enables them to be active supporters of the project and to help with risk assessment of project choices. By anticipating people's reaction to the project, preventive actions can be taken to win their support or minimize potential negative impacts.
>
> The project manager is responsible for stakeholder expectations management. Actively managing stakeholder expectations decreases the risk that the project will fail to meet its goals and objectives due to unresolved stakeholder issues, and limits disruptions during the project.

Somers and Nelson (2001:16) indicate that system implementation failures often result out of the inability to meet stakeholders' expectations and that successfully managing the expectations has been found to be positively related to a successful implementation. Francoise *et al.* (2009:385) argue that the expectations of different groups need to be translated into measurable deliverables.

Sub-factor: Project progress communication

Holland and Light (2000:19) found that communication is a formal promotion and advertisement of the project's progress from the project management team to the rest of the organisation. Sumner (1999, cited in Nah *et al.* 2003:15) remarks that, in order to adequately report on project progress, employees should be notified about the project plan, scope, objectives, activities, and updates in advance. Holland *et al*. (1999, cited in Nah *et al.* 2003:14) found that monthly bulletins, newsletters, weekly meetings, or other communication tools are useful in keeping users informed of project progress. Shanks *et al*. (2000, cited in Nah *et al.* 2003:14), found that many project managers and consultants stated that an ERP implementation is likely to fail when dates are not communicated well in advance, especially to stakeholders.

2.6.11 Data

Factor 22: Data availability, migration, consolidation and cleaning

Kapp (1998, cited in Somers & Nelson 2001:41) found that a fundamental requirement for the effectiveness of an ERP system is the availability and timeliness of accurate data. Data problems can cause serious implementation delays and, as such, the management of data entering the ERP system represents a critical issue throughout the implementation process. Somers and Nelson (2001:27) also found that:

> … within the company, the challenge lies in finding the proper data to load into the system and converting all those disparate data structures into a single, consistent format. Conversion can be an overwhelming process, especially if companies do not understand what needs to be included in the new systems and what needs to be omitted. In addition, interfaces with other internal and external systems require the ability to handle complex data sources and legacy data types.

Dorsey (2000:6) notes that data migration should be planned for early on in any project and that data migration should almost always be considered as a separate project in his own right. Rosario (2000, cited in Kalbasi 2007:42) also confirms that there should be a plan for migrating and cleaning data.

From an operational risk perspective, a survey conducted by Janakiraman (2008:44) on twenty-two Indian banks revealed that insufficient internal data, difficulties in collection of external loss data and modelling complexities are significant impediments in the implementation of an ORM framework in Indian banks.

GARP (2010:16) found that, although risk managers generally control the data they used, they are frustrated by multiple data stores and the difficulty of arriving at one single version of the truth.

A survey conducted by GARP (2010:17) indicated that only 39 per cent of respondents felt that their risk systems were integrated. GARP (2010:17) found that:

> Over the last 20 years, risk management has moved from spreadsheets to relational databases to specialized risk systems. During the same time, the financial services industry has seen waves of mergers and acquisitions and simultaneously new risk systems were developed for different types of risk – credit, market, operational and, more recently, liquidity risk. In addition, global firms were extending the reach of their systems from instruments or trading desks to an enterprise view or global positions. Individual databases implemented as point solutions over time do not add up to a single, reliable integrated source of information.

Shanks *et al*. (2000), Umble *et al*. (2003) and Zang *et al*. (2003, cited in Doom *et al.* 2009:405) recognise the importance of data accuracy and note that the input of erroneous data into the new system may have a devastating effect, because of the integrated nature of the software. Much of the success of the implementation process and ultimately the success of the system rely on the ability of the team to ensure data accuracy during the conversion process (Bajwa *et al*. 2004; Somers & Nelson 2001; Umble *et al*. 2003; Xu *et al*. 2002, cited in Finney & Corbett 2007:345). This stage of the implementation may also involve the cleaning up of suspect data (Yusuf *et al*. 2004, cited in Finney & Corbett 2007:345).

Factor 23: Data model

Dorsey (2000:6) identifies the data model as the core of the system and states, "without a carefully constructed data model; any system was doomed to failure, or at least to not meeting the users' needs and requirements".

There is general agreement on the division of database design into following steps:

> Requirement analysis, conceptual design, logical design, and physical design. Requirement analysis consists of extracting requirements from users. Conceptual design develops requirements into a conceptual model (e.g. the entity-relationship model) that is used to describe the conceptual schema. Logical design translates the conceptual schema into the data model (e.g. the relational model) supported by the target database management system. Physical design transforms the logical schema into a physical schema suitable for a specific configuration (Zhou, Wang & Li 2005:2).

McKibben and Furlonger (2009:18) comment that the data model design is critical to the overall risk and IT architectural strategy in terms of workflow, data collection, quality control, normalisation and mapping, speed of that information flow, and attendant analysis, as well as the treatment of risks.

2.6.12 Application

Factor 24: Minimal customisation to the software

Robinson and Dilts (1999, cited in Somers & Nelson 2001:37) found that minimal customisation which involves using the vendor's code as much as possible has been associated with successful implementations. Appleton (1997, cited in Somers & Nelson 2001:37) found that, because customisations are usually associated with increased information systems costs, longer implementation time, and the inability to benefit from vendor software maintenance and upgrades, customisation should only be requested when essential. Sumner (2009, cited in Kalbasi 2007:46) found that software should as far as possible not be modified and that the modifications should be avoided to reduce errors and to take advantage of newer versions and releases (Rosario 2000, cited in Kalbasi 2007:46).

McKibben and Furlonger (2009:13) found that organisations must avoid building (independently or under vendor influence) a heavily customised solution that cannot be readily assimilated into their broader IT architectures.

Sub-factor: Aligning the business processes to the software

Nah *et al.* (2003:7) identify that, in the process of configuring the system, a large amount of re-engineering should occur iteratively to take advantage of the best practices offered by the system. Enterprises should be willing to accept the embedded best practice, whenever possible, and should model their business processes according to those depicted by the system.

Factor 25: Interfaces with legacy systems and other applications

Legacy systems are the business and IT systems that encapsulate the existing business processes, organisation structure, culture and information technology (Adolph 1996; Bennett 1994; Roberts & Barrar 1992, cited in Holland & Light 2000:26).

Holland, Light and Gibson (1999, cited in Nah *et al.* 2003:21) found that business and IT legacy systems determine the degree of IT and organisational change required for implementation success. By this they mean that the greater the complexity of legacy systems, the greater the amount of technological and organisational change required. Finney and Corbett (2007:336) found that there should be consideration for the current legacy system, as the legacy system currently in place is a good indicator of the nature and scale of potential problems. They also found that this could directly affect the technical and organisational change required.

Factor 26: System testing prior to implementation

Gargeya and Brady (2005:514) found that system testing has proved to be one of the key elements of success for some organisations and a direct cause of failure for others. During the final stages of the implementation process, the project team should consider the inclusion of testing exercises (Al-Mashari *et al*. 2003; Kumar *et al*. 2002; Nah *et al*. 2001, cited in Finney & Corbett 2007:446) as well as simulation exercises before the system goes live (Yusuf *et al*. 2004, cited in Finney & Corbett 2007:446).

Callaway (1997) and Davenport (2000, cited in Grabski & Leech 2007:28) found that system testing prior to implementation provides evidence as to what should happen when the ERP system is in use, which may then be compared to the planned outcomes. System testing prior to system implementation and monitoring of the system after implementation are critical to ensure that the system operates smoothly and is able to provide adequate support for the organisation's redesigned operational processes.

Factor 27: Vendor support and past experience

Vendor support represents an important factor with any packaged software including extended technical assistance, emergency maintenance, updates, and special user training (Somers & Nelson 2001:19). Kalbasi (2007:40) found that, in choosing the software package, vendor support and the number of previous implementations should be taken into account.

2.6.13 Architecture

Factor 28: Flexible and configurable architectural framework

Technology decisions should be made against an architectural blueprint that supports the goals of the organisation (McKibben & Furlonger 2009:16). It is critical to assess the IT readiness of the organisation, including the architecture and skills (Bajwa *et al.* 2004; Siriginidi 2000a; 2000b; Tarafdar & Roy 2003, cited in Finney & Corbett 2007:346).

While successful implementations are often determined by business and organisation changes, architecture choices require thorough consideration during the system selection phase. Key architectural considerations, which should occur very early in the implementation process, revolve around centralisation or decentralisation, compatibility of existing tools, and identification of additions such as data warehouses (Spangenberg 1999, cited in Somers & Nelson 2001:19).

2.6.14 Internal audit

Factor 29: Internal audit control throughout implementation

Internal audit's involvement in the implementation helps ensure the adequacy of controls and that all parties are performing the appropriate tasks in a timely manner (Glover *et al*. 1999, cited in Grabski & Leech 2007:25). At a minimum, auditors need to stay informed throughout the system implementation process, which enables internal audit to be aware of the changes due to the new system and to adjust the audit programme accordingly (Glover *et al*. 1999, cited in Grabski & Leech 2007:26).

Grabski and Leech (2007:26) noted that:

> Other research has found that internal auditors also provide additional control procedures utilised by top management through the tracking of actionable items that need to be ratified by the steering committee, and by providing monthly reports on project risk items to the steering committee. Internal auditors are often required to provide critical performance evaluations and project review to top management and users.

From an operational risk perspective, Young (2008:40-41) identified several additional roles for internal audit:

> Internal audit should also offer an independent assessment of the underlying design of the operational risk management process. This includes examining the processes surrounding the building of operational risk management models; the adequacy and reliability of the operational risk management systems and processes; and compliance with external regulatory guidelines. Internal audit thus provides an overall assurance on the adequacy of operational risk management. This should also include the examination of controls concerning the capturing of data. Internal audit would typically also review the adequacy and effectiveness of the processes for monitoring risk management processes.

The BCBS (2003) issued the document “Sound practices for the management and supervision of operational risk” where all banks were encouraged to comply with a number of principles. The second of the ten principles proposed that:

> The board of directors should ensure that the bank’s OR management framework is subject to effective and comprehensive internal audit by operationally independent, appropriately trained and competent staff. The internal audit function should not be directly responsible for OR management (BCBS 2003:10).

2.7 CHAPTER SUMMARY

The academic literature revealed that IT projects have high failure rates, and that these high failure rates are caused in part by the myriad of factors that need to be successfully controlled throughout the project implementation life cycle. To increase the probability of a successful implementation, project managers must understand technical issues such as system development and process re-engineering as well as master the human and organisational aspects such as change management and end-user involvement. These areas of expertise were defined as critical success factors.

An overview of risk management was given and enterprise risk management was discussed along with several ERM frameworks. Operational risk was dealt with as an element of the overall ERM framework and its management was linked to the overall approach set out in the ERM framework.

To meet the needs of the Basel II Accord with respect to operational risk measurement, IT software vendors have begun developing sophisticated operational risk management systems. Operational risk engines as well as qualitative risk self-assessment tools were defined and considered as typical components of an ORMS. To define the CSFs relevant for an ORMS, a detailed review of the academic literature ensued.

The literature review was divided into several key focus areas, with the aim to establish a list of CSFs that would be relevant to a successful ORMS implementation. The initial part of the review centred on IT implementations in general and provided several success factors common across all types of IT projects. The review was then extended to include large and complex organisational IT project implementations through a focus on CSFs associated with ERP and ERM implementations. Finally, operational risk was analysed in an attempt to identify any additional and relevant CSFs.

A total of 60 CSFs were identified. These were subsequently re-examined and consolidated by means of categorisation and the reclassification of factors into sub-factors. The rationalisation process refined the initial 60 CSFs down to a final list of 29.

The chapter concluded with a detailed discussion on each the 29 CSFs. The focus of the following chapter will be to outline the research methodology used to develop the research study to validate the CSFs identified within this chapter.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

From the literature review, 29 critical success factors important for the successful implementation of an operational risk management system were identified. The objective of this study was to validate the list of 29 CSFs identified through the literature review. To achieve this, primary research was conducted with the aim of validating the identified factors for an operational risk management system implementation within the context of the South African financial services industry.

The objective of this chapter is to provide the research methodology used for the gathering and analysis of the data for this study. To achieve this objective, the chapter covers the theory of research design, research methods and finally the statistical techniques used for the analysis of the data.

3.2 RESEARCH DESIGN

A research design can be considered as a general plan or blue print used to guide the research process from formulation of the research questions and hypotheses to the reporting of the research findings (Kalaian 2008:725).

Two widely used research approaches are the qualitative and quantitative approach, which will be briefly discussed in the following section.

3.2.1 Qualitative research design

Berg (2004:46) indicates that qualitative research refers to the meanings, concepts, definitions, characteristics, metaphors, symbols and description of things. Kalaian (2008:727) states that qualitative research is inductive and context-specific research that focuses on observing and describing a specific phenomenon, behaviour, opinions, and events that exist by way of data collected through observations, documents, physical artefacts, interviews, and focus groups to generate hypotheses and theories.

As it was not the objective of this study to develop a hypothesis or theory around the CSFs for implementing an ORMS, a qualitative research design has not been considered.

3.2.2 Quantitative research design

Ragin (1989:81) states that quantitative research is a variable-oriented approach, which is theory-centred. In this approach, generality is given precedence over complexity because the researchers are interested in testing propositions derived from general theories. Kalaian (2008:729) states that quantitative research is a deductive theory-based research process that focuses primarily on testing theories and research hypotheses. This type of research investigates differences and relationships using numeric data and statistical methods to make specific conclusions about the phenomena.

Ragin (1989:96) comments that a quantitative research study begins by specifying the hypothesis to be tested and then delineating the widest possible population of relevant observations. Researchers examine the relationship between variables and conclude a model of causation. In this approach, data provides snapshots of instances. By studying correlations between variables, it is possible to derive empirical generalisations by using statistical analyses of correlations between variables.

According to Adèr, Mellenbergh and Hand (2008:112), quantitative research designs can be classified into one of two broad research design categories based on the strength of the research design's experimental control:

- experimental research designs; and
- non-experimental research designs.

Adèr *et al.* (2008:114) state that, during an experimental design, the researcher actively tries to change the situation, circumstances or experience of participants (manipulation), which leads to a change in behaviour of the participants of the study. The participants are assigned to different conditions, and variables of interest are measured. All other variables of controlled experiments are normally fixed before the data collection starts.

Adèr *et al.* (2008:116) furthermore indicate that non-experimental research is almost the same as experimental research. The only difference is that non-experimental research does not involve a manipulation of the situation, circumstances or experience of the participants.

Kalaian (2008:730) states that non-experimental or descriptive research designs aim to answer research questions about the current state of affairs, identify factors and relationships among them, and create a detailed quantitative description of the phenomena.

As it was the objective of this study to examine the current perceptions and opinions around the CSFs necessary to implement an ORMS successfully, a quantitative non-experimental research design was chosen as the best approach. When considering the associated tools for conducting the study, a survey is one such instrument to be considered.

Survey research, according to Kalaian (2008:731), is a systematic research method for collecting data from a representative sample of individuals using instruments composed of closed-ended and/or open-ended questions, observations and interviews.

Surveys are one of the most widely used non-experimental research designs. Surveys are used across disciplines to collect large amounts of survey data from a representative sample of individuals sampled from the targeted population using a variety of delivery methods such as face-to-face interviews, telephone interviews, mail, and electronic communication (Web-based and email). Each of these data collection methods has its own advantages and disadvantages in terms of cost, duration, and response rate. Belli (2008) elaborates on some of the most popular methods along with their associated advantages and disadvantages and are summarised in Table 3.1 below.

Table 3.1: Survey method advantages and disadvantages

Method	Benefits/Disadvantages
Postal communication	Benefits: • low cost • anonymity of survey respondents • low effort in distributing surveys • the respondents can complete the survey in their own time • interviewer's absence reduces interview bias Disadvantages: • postal deliveries can be subject to delays • interviewer's absence can lead to a lack of control over how the questionnaire is answered
Telephone interviews	Benefits: • questionnaire responses can be collected quickly • rapport can be established with respondents • higher response rate compared to postal and electronic communication Disadvantages: • the interviewer cannot see or respond to non-verbal signs

Method	Benefits/Disadvantages
Electronic communication	Benefits: • low cost • questionnaire responses can be collected quickly • anonymity of survey respondents • the respondents can complete the survey in their own time • low effort in distributing surveys • help or instructions can be displayed dynamically with the question as needed • automatic sequencing can determine the next question, rather than relying on respondents to follow skip instructions correctly Disadvantages: • not all of the sample may be able to access the electronic form, and therefore results may not be representative of the target population
Personally administered	Benefits: • rapport with respondents is generally higher than when using other modes • typically higher response rate than for other modes Disadvantages: • high cost and effort involved in conducting the interviews • interviewer can introduce bias by leading the interview

From Table 3.1 above, the electronic survey method appears to have the most advantages and manageable disadvantages, in comparison with the other methods. The postal method of conducting the survey, given the wide geographical distribution of the sample group along with the time to administer the survey through mail, was not considered as the best option. The telephonic method of conducting the survey was initially considered but, due to the seniority of the participants involved in the study, the telephonic survey was deemed more intrusive and time-consuming than the electronic method, which has the advantage of being completed by the respondents in their own time and across several sessions.

When examining which tool to use for the survey, Trobia (2008:18) identified the questionnaire as the main instrument for collecting data for a survey research and described it as a set of standardised questions which follow a fixed scheme in order to collect individual data about one or more specific topics. A questionnaire has thus been chosen as the preferred tool to conduct the quantitative non-experimental research for this study.

3.3 LEVEL OF MEASUREMENT

Dykema, Blixt and Stevenson (2008:556) state that, within the context of survey research, measurement refers to the process of assigning values to characteristics of individuals to indicate their position on an underlying construct.

Gershkoff (2008:441) defines five major levels of measurement: nominal, binary, ordinal, interval, and ratio. The five levels of measurement form a continuum, because as one moves from the nominal level to the ratio level, the numeric values of the variable take on an increasing number of useful mathematical properties.

- **Nominal**

Nominal variables are variables for which there is no relationship between the numeric values of the variable and characteristics those numbers represent. For nominal variables, researchers cannot compute statistics like the mean, variance or median because they will have no intuitive meaning. Nominal variables also cannot be used in associational analyses like covariance or correlation and cannot be used in regressions. To use nominal variables in associational analyses, the nominal variable must be separated into a series of binary variables. Only nonparametric[5] statistical tests can be used with nominal variables (Gershkoff 2008:422).

- **Binary**

Binary or dummy variables are a special type of nominal variable that can take on two mutually exclusive values. For instance, one might have a variable that indicates whether or not someone is male, which would take on the value one if the person is male and zero if the person is not male (i.e. female). The values are mutually exclusive because someone cannot be both male and female, and there are no other possibilities. Like with nominal variables, there is no mathematical relationship between the number one and being male, but unlike nominal variables, binary variables can be used in associational analyses (Gershkoff 2008:422).

[5] nonparametric covers techniques that do not rely on data belonging to any particular distribution (Corder & Foreman 2009:18)

- **Ordinal**

Ordinal variables are variables for which the values of the variable can be rank ordered. For instance, a researcher might ask someone his or her opinion about a certain topic, where one equals strongly agree, two equals somewhat agree, three equals somewhat disagree, and four equals strongly disagree. In this case, the values can be ranked, and researchers can make comparisons between values (Gershkoff 2008:423).

However, a researcher cannot make exact mathematical comparisons between values of the variable. For example, it cannot be assumed that a respondent who gives a response of four is twice the value of someone who gives a response of two. Researchers can, however, compare values using “greater than” or “less than” terminology and logic (Gershkoff 2008:423).

The mode and the median can be computed for an ordinal variable. The mean of an ordinal variable is less meaningful, because there is no exact numerical distance between the number assigned to each value and the value itself (Gershkoff 2008:423).

- **Interval**

With interval variables, distances between the values of the variable are equal and mathematically meaningful, but the assignment of the value zero is arbitrary. Unlike with ordinal variables, the differences between values assigned to the variable are meaningful, and researchers use the full range of parametric statistics to analyse such variables (Gershkoff 2008:424).

As with ordinal variables, interval variables can be used in associational analyses, but the conclusions drawn are dependent upon the way that numbers were assigned to the values of the variable. Interval variables can be rescaled to have a different value arbitrarily set to zero, and this would change both the sign and numerical outcome of any associational analyses. Parametric statistics can be used with interval variables (Gershkoff 2008:424).

- **Ratio**

With ratio variables, distances between values of the variable are mathematically meaningful, and zero is a non-arbitrarily assigned value. Values assigned to ratio variables can be added, subtracted, multiplied, or divided. With ratio variables, researchers can calculate mean, median, mode and variance and can use ratio variables in the full range of parametric associational analyses, with meaningful results (Gershkoff 2008:424).

Dykema *et al.* (2008:557) comment that of the five levels of measurement, ordinal measures are more sophisticated than nominal or binary measures but less statistically powerful than interval or ratio measures.

Characteristics of scales generally determine the appropriate statistics. Ordinal scales are best suited for nonparametric statistics such as modes and chi-square, but they are often also used for correlations, analyses of variance, and in mathematical models.

Ordinal measures convey information about the relationship between values, that one value is greater than another, but they do not indicate how much greater a value is. Although “excellent” is greater in value than “very good”, one cannot say with certainty that the distance between those two values is the same, less, or more than the distance between “very good” and “good” (Dykema *et al.* 2008:557).

With this study focusing on non-experimental quantitative research, it was possible to measure the variables across a scale. Dykema *et al.* (2008:557) note that ordinal measures are typically obtained with ordinal scales that include closed-ended response categories in which the categories are labelled using words, numbers, or some combination of both. A Likert scale is one such example of an ordinal scale.

Likert scales according to Dykema *et al.* (2008:557) are bipolar, and include categories with both positive and negative values. A typical example is one in which respondents are asked their level of agreement with a particular statement, with response options ranging from “strongly disagree”, “somewhat disagree”, “neither”, “somewhat agree”, to “strongly agree”. With regard to labelling, decisions include whether to label all of the categories or just the end points with verbal descriptions, or whether to label the categories with a combination of verbal descriptions and numbers. Overall, data quality is optimised when every scale point is represented by a verbal description.

The Likert scale (Dykema *et al.* 2008:557), including the category descriptions used for this study is discussed further in Section 3.5.3 below.

To be confident of results generated through the study, it is also important to know that the measures being used are reliable and have been validated. Section 3.4 discusses the approach and methodology to pre-test the questionnaire to ensure that it is both valid and reliable.

3.4 PRE-TESTING FOR VALIDITY AND RELIABILITY

To determine the effectiveness of a survey questionnaire, it is necessary to pre-test it before actually using it. Pre-testing can help determine the strengths and weaknesses of the survey concerning question format, wording and order. In addition, pre-testing usually involves testing the questionnaire for reliability and validity. Chisnall (1997:76) confirms that validity and reliability have to be considered in the study to reduce the risk of obtaining incorrect answers to research questions.

Singh (2007:34) notes that reliability refers to the ability of a measurement instrument to measure in a consistent manner each time it is used. Validity refers to the extent to which a measurement instrument measures consistently against some criterion.

3.4.1 Validity

Knapp (2008:938) defines validity primarily as a measurement term, having to do with the relevance of a measuring instrument for a particular purpose. Saunders, Lewis and Thornhill (2000:18) note that validity is concerned with whether the findings are really about what they appear to be about. Chisnall (1997:78) states that validity refers to how well a specific research method measures what it was designed to measure.

Singh (2007:36) indicates that both internal and external validity should be evaluated in quantitative research.

Howell *et al.* (2005:4) notes that internal validity refers, firstly, to the rigor with which the study was conducted (e.g. the study's design, the care taken to conduct measurements, and decisions concerning what was and was not measured). Secondly, validity refers to the extent to which the designers of a study have taken into account alternative explanations for any causal relationships they explore. As this study did not focus on exploring causal relationships, only the first definition is applicable.

External validity refers to the extent to which research results generalise to other situations. A research investigation is said to have external validity if the results can be made general. There are several types of validity in the literature:

- **Face validity** – is concerned with how a measure or procedure appears Howell *et al.* (2005:4). As a preliminary screening, face validity is required when a new measure is developed (Bryman & Cramer 2001:18). Face validity is an intuitive process and is established by asking other people whether the measure seems to capture the concept (Singh 2007).
- **Criterion-related validity** – criterion-related validity, also referred to as instrumental validity, is used to demonstrate the accuracy of a measure or procedure by comparing it with another measure or procedure, which has been demonstrated to be valid (Howell *et al.* 2005:4).
- **Construct validity** – seeks agreement between a theoretical concept and a specific measuring device or procedure. Construct validity can be broken down into two sub-categories: convergent validity and discriminate validity. Convergent validity is the actual general agreement among ratings, gathered independently of one another, where measures should be theoretically related. Discriminate validity is the lack of a relationship among measures, which theoretically should not be related (Howell *et al.* 2005:4).

- **Content validity** – is based on the extent to which a measurement reflects the specific intended domain of content (Carmines & Zeller 1991, cited in Howell *et al.* 2005:5).

Content validity was the most appropriate validity type for this study as the proposed questionnaire measured the attitudes and opinions of individuals towards a set of pre-defined CSFs identified from the literature review. Content validity was tested by means of a pilot study with a selected panel of experts in the field of ORM.

3.4.2 Reliability

Yin (2003) states that the goal of reliability is to minimise the errors and biases in a study and that reliability refers to the stability and consistency of the results derived from the research. It is the probability that the same results would be obtained if the measures used in the research were simulated. Knapp (2008:940) defines reliability as whether or not the results are relevant to the purpose for which the instrument is intended.

Singh (2007:34) notes that there are four good methods of measuring reliability: the test-retest method, alternate forms, internal consistency, and inter-scorer reliability.

Test-retest is a method of estimating test reliability in which a test developer or researcher gives the same test to the same group of research participants on two different occasions. The results from the two tests are then correlated to produce a stability coefficient. Studying the coefficients for a particular test allows the assessor to see how stable the test is over time (Kaplan & Saccuzzo 2001:178).

Alternate forms – this type of reliability makes a second form of a test consisting of similar items, but not the same items possible. Researchers administer this second “parallel” form of a test after having already administered the first form. This allows researchers to determine a reliability coefficient that reflects error due to different times and items and also allows control of the test form. By administering form A to one group and form B to another group, and then form B to the first group and form A to the second group for the next administration of the test, researchers are able to find a coefficient of stability and equivalence. This is the correlation between scores on two forms and takes into account errors of different times and forms (Kaplan & Saccuzzo 2001:179).

Internal consistency – there are three ways to measure the consistency of a test with only one form:

- **Split-half reliability** – Cohen and Swerdlik (2002:126) describe split-half reliability as a useful measure when impractical or undesirable to assess reliability with two tests or to have two test administrations (because of limited time or money).

Kaplan and Saccuzzo (2001:179) describe the method as follows:

- 1st step: divide test into halves.
- 2nd step: find the correlation of scores between the two halves by using the Pearson r formula.
- 3rd step: adjust or re-evaluate correlation using the Spearman-Brown formula, which increases the estimate reliability even more.

Spearman-Brown formula:

$$r = \frac{2r}{1+r}$$

Where:

- r = estimated correlation between two halves (Pearson r) (Kaplan & Saccuzzo 2001:179).

- **Kuder-Richardson formula** – Kaplan and Saccuzzo (2001:180) indicate that another way to evaluate a test internally would be to use the Kuder-Richardson 20. This is only advisable if you have dichotomous items in a test (usually for right or wrong answers).

$$KR_{20} = r = \frac{N(S_{2alpha}pq)}{N-1(s2)}$$

KR_{20} = reliability estimate (r)

Where:

- N = the number of items on the test
- S_2 = the variance of the total test score
- p = proportion of people getting each item correct (this is found separately for each item)
- q = the proportion of people getting each item incorrect. For each item, q equals 1-p.
- $_{alpha}$pq = the sum of the products of p times q for each item on the test.

- **Cronbach's alpha/Coefficient alpha** – Aiken (2003:82) describes the Cronbach's alpha/coefficient alpha formula as a general formula for estimating the reliability of a test consisting of items on which different scoring weights may be assigned to different responses.

$$a = (\frac{K}{K-1})x[1 - \sum \frac{S_i^2}{S^2_{sum}}]$$

Where:

- K = the number of items
- S_i^2 = the variance of scores on item i
- S^2_{sum} = the variance of total test scores

Inter scorer reliability as defined by Kaplan and Saccuzzo (2001:181) measures the degree of agreement between persons scoring a subjective test. This research method reveals how well the scorers agree when rating the same set of things.

Having considered the available methods for calculating the reliability of the study, the split-half reliability test, including Cronbach's alpha, has been chosen as the most optimal tool for measuring the internal consistency of the questionnaire due to the limited time of the respondents to complete a second questionnaire.

Having outlined the methods and tests available for testing the reliability and validity, Section 3.5 focuses on the methodology applied to gather the data for the study.

3.5 DATA GATHERING METHOD USED FOR THIS STUDY

According to Knapp (2008:939), the key goal of non-experimental survey research is to collect data and describe the behaviours, thoughts, and attitudes of a representative sample of individuals at a given point in time and place.

Based on the advantages and disadvantages of the various survey delivery methods cited in Table 3.1 above, a Web-based questionnaire method was selected as the best tool to conduct the primary research. According to Perkins (2004:124-126), the benefits of a Web-based survey tend to include:

- flexible instrument – provides a flexible survey instrument that can include text, images, sounds and video material as well as dynamic filtering by the respondent;
- sampling – can access larger and geographically broader samples;
- human resources – requires fewer resources, for example no photocopying, folding, coding or verifying;
- time resources – improved, survey available 24/7, and shorter delivery time;
- material resources – requires less materials, for example, paper and stamps;

- reduced costs – fewer human and material resources required; and
- analysis:
  - direct transmission of data, including coding and analysis;
  - more complete replies to open-ended questions; and
  - potential for customised feedback.

Increased sample-size availability and time efficiencies were also supported by Eaton and Struthers (2002:306) and by Roztocki and Lahri (2003:21). Benefits such as reduced costs have also been widely recognised by other authors in the literature (Cobanoglu *et al*. 2001:446; Eaton & Struthers 2002:306 and Roztocki & Lahri 2003:21).

In addition, it was found that Web-based surveys lead to an improvement in data capture and analysis because there is no need to enter the data manually. With manual data entry, there are risks of input errors (Griffis, Goldsby & Cooper 2003:240). Significant time savings through response speed due to high availability and fast delivery were also identified (Cobanoglu *et al.* 2001:447; Griffis *et al.* 2003:241).

For this study, the most important advantages of a Web-based survey compared to other delivery methods were considered as:

- the most efficient method in terms of sending and receiving as a Web-based questionnaire has:
  - response validation to ensure a minimum number of questions are answered as well as validation to ensure correct entry of data;
  - automated skip logic, based on the respondents input; and
  - speed of completion; and
- given the seniority of the respondents involved, a Web-based questionnaire can be completed anywhere and anytime of day. It can also be completed across several sessions, which reduces the single amount of time the respondent needs to commit.

For all the benefits of Web-based surveys, the main disadvantage cited in the academic literature is that electronic surveys have been associated with lower response rates and higher drop-out rates than traditional surveys (Fricker & Schonlau 2002:349).

The lower response rate has been attributed to increased surveying and spam email, the threat of viruses, and the fact that the novelty aspect of completing surveys online has passed (Sheehan 2001:12).

To mitigate this risk, all identified participants in this survey were contacted prior to the survey being sent out through a formal invitation letter. The initial communication detailed the purpose of the study, process and timeline, and also gained agreement from the respondents for their participation in the study. Appendix two contains the invitation letter that was sent to the identified respondents from the target audience. To entice participation in the questionnaire, a copy of the results shall be shared with the respondent upon completion of the study.

Survey design

A Web-based survey tool was the primary tool for disseminating the questionnaire as well as gathering and analysing the responses. SurveyMonkey was chosen as the tool to construct and disseminate the questionnaire. The tool was chosen for its ease of use and full list of features in designing and analysing questionnaire responses. Being a Web-based tool also allowed the respondents to complete the questionnaire online in their own time and space without having to download any specific software.

The questionnaire design was based on the 29 consolidated CSFs identified through the literature review. For each CSF, a question assessed the perceived importance and criticality of that factor in the ORMS implementation process. The questionnaire also sought to prioritise both the identified CSF categories as well as CSFs within each category based on a point allocation system. The questionnaire consisted entirely of closed-ended questions.

In addition to capturing the respondent's perception surrounding the importance and criticality of each of the identified CSFs in an ORMS implementation, the questionnaire sought to capture:

- type of financial service organisation being surveyed;
- respondent's role within the organisation and years of experience;
- whether the organisation has or is planning to implement an ORMS;
- the priority of one CSF over another within the same category; and
- prioritisation of one category of CSFs over another.

Section 3.5.1 below describes the target population for the questionnaire.

3.5.1 Target population

The South African financial services industry, and in particular, the banking industry is dominated by four major players, namely Standard Bank, Absa, Nedbank and FirstRand Bank. In 2010, these four accounted for approximately 90 per cent of the industry total assets (Table 3.2).

According to data obtained from the South African Reserve Bank (SARB), the banking industry in South Africa consists of 35 formal banking institutions (SARB 2011). Of these, 14 are locally controlled, six are foreign-controlled and there are 15 registered branches (SARB 2011).

Table 3.2: The South African banking landscape

Bank	*Assets 2010 (Rs)	2010 Market share (%)
Standard Bank	1 336 308	27.1%
FirstRand Bank	845 240	18.5%
Absa Bank	716 470	21.9%
Nedbank	608 718	17.2%
Investec Bank	517 413	6.1%
African Bank	39 202	0.8%
Capitec Bank	9 488	0.3%
Mercantile Bank	6 263	0.2%
Ubank (Teba)	3 313	0.1%
Imperial Bank**	n/a	1.8%
Others	n/a	6%
Total market	**n/a**	**100.0%**

* Total Assets 2010 – sourced from annual reports
** Incorporated into Nedbank

For the purposes of this research study, the target population for the South African financial services industry comprised of the four largest banks, as well as two additional banks, namely Investec Bank and Rand Merchant Bank (incorporated under the FirstRand Group). Based on Table 3.2 above, these institutions together constitute approximately 90 per cent of the South African banking market (by assets) and are considered to be the most sophisticated financial services organisations in the industry in terms of information technology maturity.

Table 3.3 below identifies the target group of respondents from within the South African financial services industry:

Table 3.3: Financial services target population for the research study

ID	Organisation
1	Standard Bank
2	Nedbank
3	FirstRand Bank
4	Absa Bank
5	Investec Bank
6	Rand Merchant Bank (part of FirstRand Group)

To ensure that a broad range of financial services were covered, the target population included the retail, wholesale and private banking divisions (where applicable) for the above-mentioned banks.

Retail banking, as defined by Ding and Behera (2009:39) constitutes, “typical mass-market banking in which individual customers use local branches of larger commercial banks. Services offered include savings and checking accounts, mortgages, personal loans, debit/credit cards and certificates of deposit (CDs).”

Wholesale banking, as defined by Ding and Behera (2009:39) constitutes, “banking services between merchant banks and other financial institutions. Wholesale banking deals with larger institutions, whereas retail banking would focus more on the individual or smaller business. Some services might include currency conversion, working capital financing and large trade transactions.”

Private banking, as defined by Ding and Behera (2009:40) constitutes, “personalized financial and banking services that are traditionally offered to a bank's rich, high net worth individuals (HNWIs). For wealth management purposes, HNWIs have accrued far more wealth than the average person, and therefore have the means to access a larger variety of conventional and alternative investments. Private banks aim to match such individuals with the most appropriate options.”

In addition to the identified financial services institutions, IT consulting firms were also considered in the target population, as IT consulting firms are often contracted by the financial services institutions to play some role in the implementation process. Thus, it was assumed that these firms would have a considerable amount of experience and expertise in implementing an ORMS.

Within the targeted firms, the survey itself was administered to personnel within the target organisations who were involved directly or indirectly with an ORMS implementation, and included:

- the organisation's IT department;
- finance and risk departments; and
- internal and external consultants involved with the ORMS implementation.

In general, the personnel tended to have the following positions within the target organisations:

- chief financial officer and/or chief risk officer;
- risk manager;
- internal auditor;
- operational risk manager; and
- ORMS consultant.

IT consulting firm's role:

- consultant with experience of an ORMS implementation.

Having outlined the study's target population, Section 3.5.2 below describes the format of the questions that were used in the questionnaire.

3.5.2 Format of the questions

As previously highlighted, the questionnaire consisted entirely of closed-ended questions with some additional questions to capture general information about the respondents and their organisations.

Trobia (2008:656) notes that questionnaires are usually composed of three main parts: the cover letter (or introduction), the instructions and the main body. Usually, they finish with thanking the respondents for their valuable collaboration.

Trobia (2008:656) states that the cover letter introduces the research and tries to motivate the respondents to cooperate with the survey objectives. The cover letter also explains the aim of the research and, above all, guarantees the anonymity or at least the confidentiality of the respondents. Trobia (2008:656) identifies the cover letter as one of the key elements in improving the response rate.

Trobia (2008:656) further notes that instructions are especially important when the questionnaire is self-administered. Instructions contain all the rules the respondents must follow in answering the questions. Finally, the main body of the questionnaire includes all of the questions that the respondent has to answer.

Barribeau *et al.* (2005:4) state that, during the development of the questionnaire, the following principles should generally be adhered to:

- **Directness** – questions should be written in a straightforward, direct language that does not include complex language or syntax. Questions should be specifically tailored for a group of respondents.
- **Simplicity** – questions should be kept short and simple. Respondents should not be expected to learn new, complex information in order to answer questions.
- **Specificity** – specific questions are for the most part better than general ones.
- **Discreteness** – avoid questions that are overly personal or direct, especially when dealing with sensitive issues.

Barribeau *et al.* (2005:6) suggest that the following types of questions should be avoided:

- double-barrelled questions which force respondents to make two decisions in one;
- double negative questions;
- hypothetical questions which are typically too difficult for respondents since they require more scrutiny;
- biased questions which incorporate the researcher's feelings or attitudes towards a topic; and
- questions with long lists – these questions may tire respondents or respondents may lose track of the question.

An important aspect of the design of a questionnaire is the choice of measuring scale. Section 3.5.3 below discussed the choice or measuring scale in further detail.

3.5.3 Choice of measuring scale

In Section 3.3 above, it was discussed that an ordinal scale seemed most appropriate for the nature of this study. The Likert type scale was also briefly discussed as one of the most common forms of ordinal measuring scales.

Brill (2008:430) describes the Likert scale as a special type of the more general class of summated rating scales constructed from multiple ordered-category rating items. Brill (2008:430) further notes the distinguishing characteristics as:

- each item uses a set of symmetrically balanced bipolar response categories indicating varying levels of agreement or disagreement with a specific stimulus statement expressing an attitude or opinion (e.g. ripe cherries are delicious);

- the response category points for each item are individually labelled (e.g. Strongly Agree, Agree, Disagree, Strongly Disagree); and
- the descriptive text of these labels is chosen so that gradations between each pair of consecutive points seem similar.

Brill (2008:430) noted that Likert response sets typically include four or more points. A five-category scale has been selected for this study, with the points as defined in Table 3.4 below:

Table 3.4: Likert-type scale

Scale value	Scale description
1	**Neither critical nor important**. Indicates that the statement is neither critical nor important for an ORMS implementation according to the respondents' view and experience.
2	**Important but not critical**. Indicates that the statement is important but not critical for an ORMS implementation according to the respondents' view and experience.
3	**Somewhat critical and important**. Indicates that the statement is somewhat critical and important for an ORMS implementation according to the respondents' view and experience.
4	**Critical and important**. Indicates that the statement is critical for an ORMS implementation according to the respondents' view and experience.
5	**Extremely critical and important**. Indicates that the statement is very critical and important for an ORMS implementation according to the respondents' view and experience.

Brill (2008:430) holds that, after data collection, Likert items may be analysed individually, or the value scores observed among theoretically related items may be summed or averaged to create a Likert scale. When treated as ordinal data, Likert item results can be analysed using nonparametric tests or chi-square tests of association. Likert scale data may be treated as interval data measuring a latent variable, and if relevant assumptions are met, parametric statistical tests (e.g. analysis of variance) can be applied. Finally, data from Likert items or scales is sometimes reduced to the nominal level by combining all agree and disagree responses into one of two corresponding categories (e.g. "accept" vs. "reject"). When this transformation occurs, a chi-square or McNemar test is the statistical procedure typically applied (Brill 2008:430).

For this study, the questions for the questionnaire were formulated based on the 29 CSFs identified through the literature review in Chapter two. Appendix three contains a copy of the questionnaire that was distributed to the target population as part of this study.

Prior to circulation among the target population, a pre-test or pilot study was conducted to establish validity and reliability of the questionnaire. Section 3.5.4 provides further detail regarding the pilot study conducted for this study.

3.5.4 Pre-testing the questionnaire

Hutt and Speh (2001:29) stress the importance of pilot studies before conducting any survey research. Hutt and Speh (2001:29) find a pilot study of between five to ten cases as sufficient to discover the major flaws in the questionnaire. Pilot studies are important as they tend to:

- examine the reliability, validity, accuracy, integrity and ambiguity of the questionnaire;
- identify any omission of important factors; and
- examine any needs to integrate or remove certain factors from the questionnaire.

To this end, the draft questionnaire was pre-tested to determine its validity and reliability in cooperation with management consultants from IBM and Accenture who, in their role as system implementers, had previously been involved with ORMS implementations.

Pre-testing of the questionnaire was performed with a representative group of 15 per cent of the sample group, consisting of managers and senior managers from both IBM as well as Accenture.

3.5.4.1 Validity

As a first step toward proving validity of the survey instrument, face validity was sought through a review of the draft questionnaire by academic supervisors. Once complete, feedback was incorporated and a revised draft of the questionnaire produced.

In Section 3.4.1 above, it was noted that content validity was the best validity criteria for this study because the questionnaire measured the attitude and opinions of individuals against a set of pre-defined CSFs.

An instrument can be considered valid in content if it has drawn representative questions from a universal pool and if it has been subjected to a thorough reviewing process of the items by experts (Sedera, Gable & Chan 2003:4). To provide content validity, all the variables in the current study had been broadly studied and discussed in the literature review.

The instrument was tested with management consultants who were experts in ORMS implementations.

Besides being asked to complete a draft version of the questionnaire, the management consultants were asked to complete an additional diagnostic questionnaire, which enabled the respondents to capture their thoughts around the questionnaire design. The diagnostic questionnaire used can be seen in Appendix four.

The results from the diagnostic questionnaire are presented below in Table 3.5 and indicate that:

- the respondents felt that the questionnaire was comprehensive in its critical success factor coverage;
- they understood the objectives of the questionnaire; and
- they understood all the questions in the questionnaire.

Table 3.5: Diagnostic questionnaire results

To what degree did you feel that the questionnaire was comprehensive in its coverage of possible critical success factors?							
Answer options	**To no degree**	**To a lesser degree**	**To a fair degree**	**To a high degree**	**Totally**	**Rating average**	**Response count**
Please select the most appropriate	0	0	1	6	0	3.86	7
					answered question		**7**
					skipped question		**0**
To what degree did you understand the objectives and aim of the questionnaire?							
Answer options	**To no degree**	**To a lesser degree**	**To a fair degree**	**To a high degree**	**Totally**	**Rating average**	**Response count**
Please select the most appropriate	0	0	3	3	1	3.71	7
					answered question		**7**
					skipped question		**0**
To what degree did you comprehend the questions?							
Answer options	**To no degree**	**To a lesser degree**	**To a fair degree**	**To a high degree**	**Totally**	**Rating average**	**Response count**
Please select the most appropriate	0	0	1	5	1	4.00	7
					answered question		**7**
					skipped question		**0**

The pre-testing also revealed (Table 3.6 below) that:

- the questionnaire took on average between 10 and 20 minutes to complete;
- the instructions to complete the questionnaire were clear;
- the Likert scale used was appropriate for this type of questionnaire;
- the questionnaire was structured in a logical manner; and
- no problems or issues were reported in completing the questionnaire online.

Table 3.6: Diagnostic questionnaire results continued

How long did it take to complete the full questionnaire?		
Answer options	**Response per cent**	**Response count**
0 to 10 minutes	0.0%	0
10 to 20 minutes	71.4%	5
20 to 30 minutes	28.6%	2
More than 30 minutes	0.0%	0
	answered question	**7**
	skipped question	**0**

Were the instructions to complete the questionnaire simple and clear?		
Answer options	**Response per cent**	**Response count**
Yes	100.0%	7
No	0.0%	0
	answered question	**7**
	skipped question	**0**

To what degree did you feel that the scale used was appropriate for the questionnaire?							
Answer options	**To no degree**	**To a lesser degree**	**To a fair degree**	**To a high degree**	**Totally**	**Rating average**	**Response count**
Please select the most appropriate	0	0	3	4	0	3.57	7
					answered question		**7**
					skipped question		**0**

To what degree did you feel that the questionnaire was structured in a logical manner?							
Answer options	**To no degree**	**To a lesser degree**	**To a fair degree**	**To a high degree**	**Totally**	**Rating average**	**Response count**
Please select the most appropriate	0	0	4	2	1	3.57	7
					answered question		**7**
					skipped question		**0**

Based on the feedback received from the pilot study, the questionnaire could be regarded as being valid.

3.5.4.2 Reliability

For the purpose of this study, the split-half method including Cronbach's alpha was selected to test the questionnaire for reliability. Time restrictions on the participant's part did not allow for a follow-up questionnaire, which ruled out the test-retest method.

As outlined in Section 3.4.2 above, Kaplan and Saccuzzo (2001:179) define the split-half method as a test given and divided into halves and then scored separately. The score of one half of the test is then compared to the score of the remaining half to test the reliability.

Kaplan and Saccuzzo (2001:179) outline the steps to the split-half method as:

- 1st step: divide test into halves. The 29 CSFs were divided into two groups:
  - group one: all CSF questions under the categories strategy, pre-project planning, scope, project resources, project management and performance monitoring; and
  - group two: all CSF questions under the categories performance monitoring, decision-makers' support from senior management, governance, change management, communication, data, application, architecture and internal audit.
- 2nd step: find the correlation of scores between the two halves by using the Pearson r formula.
- 3rd step: adjust or re-evaluate correlation using Spearman-Brown, Guttman split-half coefficient and Cronbach's alpha formulae which increases the estimate reliability even more.

The results of the test as presented in Table 3.7 below:

Table 3.7: Reliability results

Reliability test			Result
Cases	Valid	44	84.6%
	Excluded[6]	8	15.4%
	Total	52	100.0%
Split-half method	Part 1	Value	.746
		N of items	15
	Part 2	Value	.824
		N of items	14
		Total N of items	29
		Correlation between forms	.778
Spearman-Brown coefficient		Equal length	.875
		Unequal length	.876
		Guttman split-half coefficient	.862
Cronbach's alpha			.882

[6] Excluded due to incomplete total data set

The results of the tests, depicted in Table 3.7 above, show an internal consistency between the two groups as the Spearman-Brown, Guttman split-half coefficient and Cronbach's alpha coefficient were all significant and demonstrated reliability as they were greater than the threshold of 0.7.

3.6 STATISTICAL ANALYSIS

Heffner (2004:86) states that there are two major branches of statistics, each with its own specific goals and specific formulas:

- **Descriptive statistics,** which refers to the analysis of data of an entire population. In other words, descriptive statistics is merely using numbers to describe a known data set. The term *population* denotes that the entire set of possible subjects is used as opposed to just a sample of the subjects. Antonius (2003:128) noted that descriptive statistics aims at describing a situation by summarising information in a way that highlights the important numerical features of the data.
- **Inferential statistics,** which has two goals: firstly, to determine what might be happening in a population based on a sample of the population and, secondly, to determine what might happen in the future. Thus, the goals of inferential statistics are to estimate and/or predict. To use inferential statistics, only a sample of the population is needed. Descriptive statistics, however, requires using the entire population.

When evaluating which statistical method to use, Heffner (2004:87) notes that it is important to determine firstly which statistical procedure to use. Statistical procedures are designed specifically to be used with certain types of data, namely parametric and non-parametric. Parametric data consists of any data set that is of the ratio or interval type and which falls on a normally distributed curve. Non-parametric data consists of ordinal or ratio data that may or may not fall on a normal curve.

As the questionnaire comprised of an ordinal scale and the respondents were not a random sample but rather a purposive sample, the study lent itself to nonparametric statistics as well as a descriptive analysis.

In order to interpret the data, the arithmetic mean was considered as an important part of the analysis and as such, the Likert scale, in conjunction with the arithmetic mean, was used to reach conclusions around the responses.

The Kruskal-Wallis test was used to find significant differences in the data, as most of the data was ordinal by nature and had three or more items per independent variable. For this study, the tests were conducted at the five per cent level of significance.

Welman, Kruger and Mitchell (2007:21) state that the Kruskal-Wallis test is regarded as the nonparametric alternative to the regular one-way analysis of variance and is used to compare the medians of three or more independent samples. The test is a generalised version of the Mann-Whitney U test[7] and it does not assume that the samples have been drawn from normally distributed populations with equal variances.

The statistical analysis section comprised of two main areas. Firstly, a statistical analysis of the demographic data was used to provide insight into the business-type level of experience in implementing an ORMS as well as the positions held by respondents. Secondly, a statistical analysis of the significance of the identified CSFs within the identified CSF categories as well as an analysis into the differences of perceptions (if any) across the respondents' demographic characteristics was used.

3.7 CONCLUSION

The chapter included a review of the research design for the primary research aspect of this study. The design was examined from both the qualitative and quantitative perspectives. Through academic research, a survey methodology was identified as one of the most widely used non-experimental research designs. As several survey methodologies existed, an analysis was conducted to review the advantages and disadvantages of each of the specific methods, with the electronic survey method being selected as the most appropriate for this study. Different data measurement techniques were discussed, with an ordinal scale using a Likert scale being selected as the most appropriate.

The use of a questionnaire was identified as the most suitable survey tool. The questionnaire was then developed to determine whether the critical success factors identified through the literature review in Chapter two were indeed critical and important to the implementation of an operational risk management system. The questionnaire was pre-tested by means of a pilot study, which found the questionnaire to be valid from a content perspective.

Having confirmed the validity of the questionnaire, the target audience within the South African financial services industry was defined and the questionnaire distributed via an online survey tool. The results from the survey were collected and analysed to determine reliability via the split-half method. The survey proved to be reliable and returned a statistically significant result.

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[7] Non-parametric statistical hypothesis test for assessing whether one of two samples of independent observations tends to have larger values than the other. (Corder & Foreman 2009:18)

Descriptive statistics was confirmed to be the most appropriate way to describe the results of the survey as the data was ordinal by nature.

Chapter four will focus on the analysis and interpretation of the research results in accordance to the methodology outlined in this chapter.

CHAPTER 4

DATA ANALYSIS AND FINDINGS

In Chapter three, the statistical methodology as well as the process and development of the questionnaire were laid out. Chapter four deals with the analysis and interpretation of the data collected through the questionnaire. The chapter provides an overview of the demographics of the responses as well as a statistical analysis of the defined CSFs. The statistical analysis examines the significance of the 29 identified CSFs, provides insight into their prioritisation and investigates the respondents' perceptions of these factors across different respondent types.

4.1 DEMOGRAPHIC DATA ANALYSIS

The sections below provide an overview and summary of the study's population demographics.

4.1.1 Response by type of institution

A total of 52 questionnaires were completed (68 per cent response rate) by the target group of financial institutions identified in Chapter three. This response was out of an approximate total population of 76 respondents, although the total population was difficult to determine as the invitation to the survey contained a link to the questionnaire which was forwarded by some of the participants to a wider audience within the participating organisations.

Responses across all business-type categories were received; however, analysis of the results (Figure 4.1 below) indicated that the majority of respondents were from consulting firms and retail banks, which represented the largest respondent categories at 42 per cent and 34 per cent respectively With all types of banks represented in the sample, the questionnaire findings may therefore be assumed to be relevant to all bank types unless significant differences exist at the CSF level. A more detailed investigation into the significance of factors across business types is conducted further in this chapter.

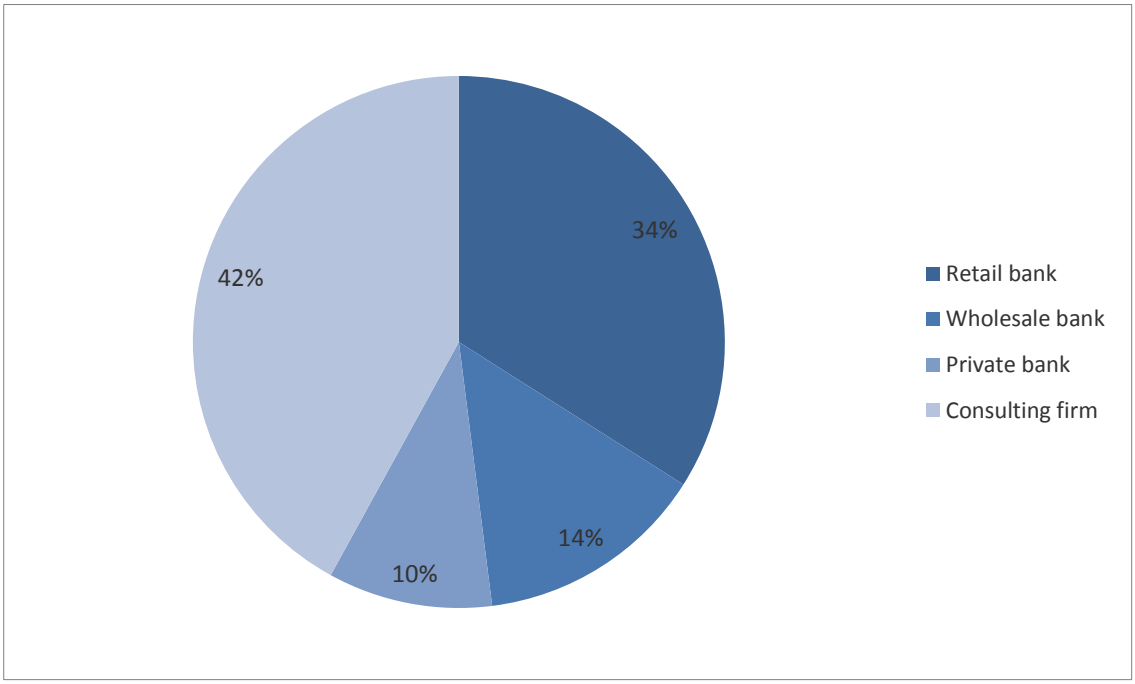

Figure 4.1: Business type summary

4.1.2 Response by title/position of respondent

While almost every category of respondent had a positive reply, analysis of the cumulative results (Figure 4.2 below) of the respondents to the survey indicated that mostly risk managers completed the survey. Of the 52 respondents, 44 per cent were found to be risk managers with the second largest respondent group being external consultants at 21 per cent.

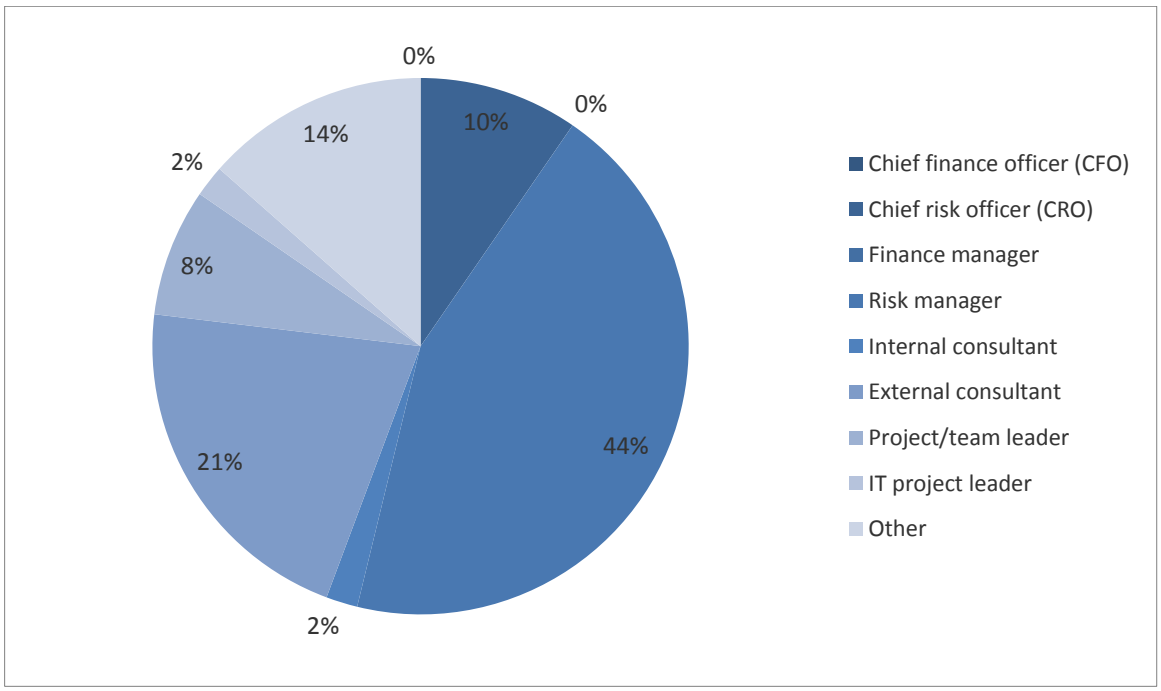

Figure 4.2: Title/position summary

4.1.3 Response by ORMS implementation status

When examining whether or not the respondents had implemented or were planning to implement an ORMS, an overwhelming 78 per cent responded that they had or were planning to implement an ORMS. According to Figure 4.3 below, 49 per cent indicated that they had implemented an ORMS before, with almost 29 per cent planning to implement an ORMS. The high degree of planned and completed implementations was a strong indication of the importance of implementing an ORMS and that the survey had reached the correct target audience.

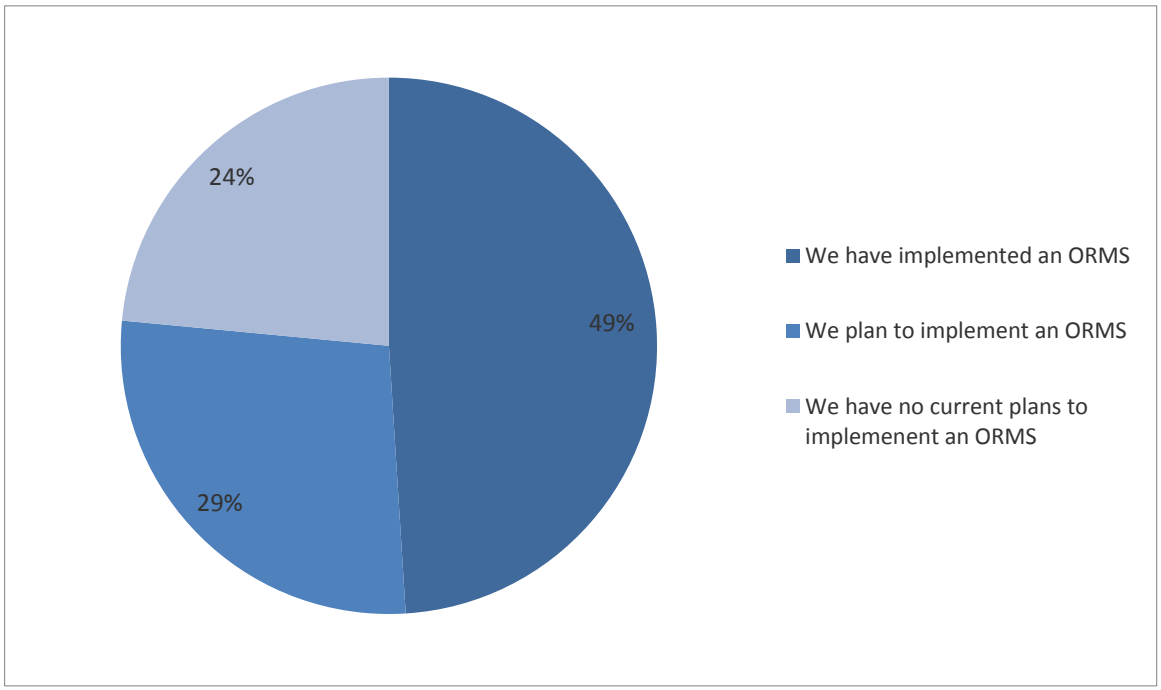

Figure 4.3: ORMS implementation status summary

4.1.4 Response by ORMS implementation experience

The high level of experience in implementing an ORMS indicated that the questionnaire was completed by experienced respondents. Over 60 per cent of the respondents indicated that they had three or more years of experience in implementing an ORMS, with more than 37 per cent of the respondents having had more than five years of experience (See Figure 4.4 below). As such, the response can be considered at an acceptable level of experience.

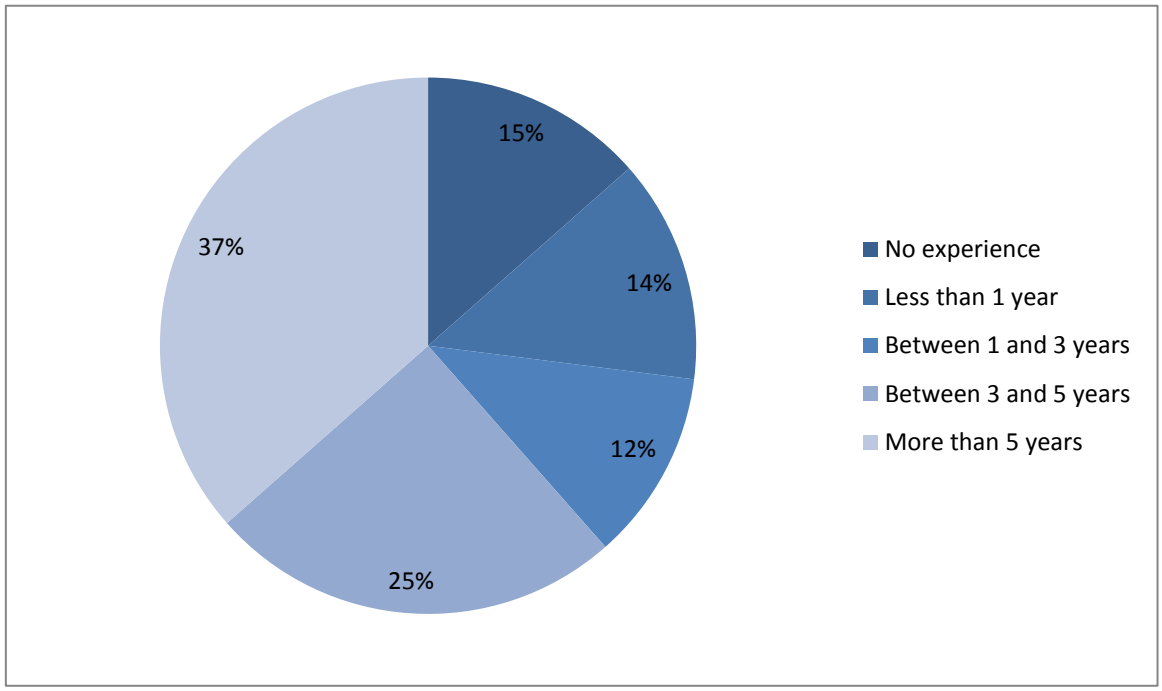

Figure 4.4: ORMS implementation experience summary

4.2 STATISTICAL ANALYSIS OF CRITICAL SUCCESS FACTORS

The next section presents the results of the survey around the respondents' perceptions of each of the critical success factors.

4.2.1 Significance of critical success factors

To determine the significance of the 29 critical success factors identified through the literature review, the respondents were asked to rate each CSF from "Neither critical nor important" to "Extremely critical and important". Each CSF category was assigned a value from one for "Neither critical nor important" to five for "Extremely critical and important" and the weighted average per CSF computed. The results in Figure 4.5 below indicate that all the identified CSFs were deemed at least somewhat critical and important (i.e. had a weighted mean greater than three) by the respondents with the exception of two CSFs. CSF 24 and 29, were considered important but not critical as their medians were less than three but greater than two. A description of the Likert rating value used can be found in Table 4.1 below.

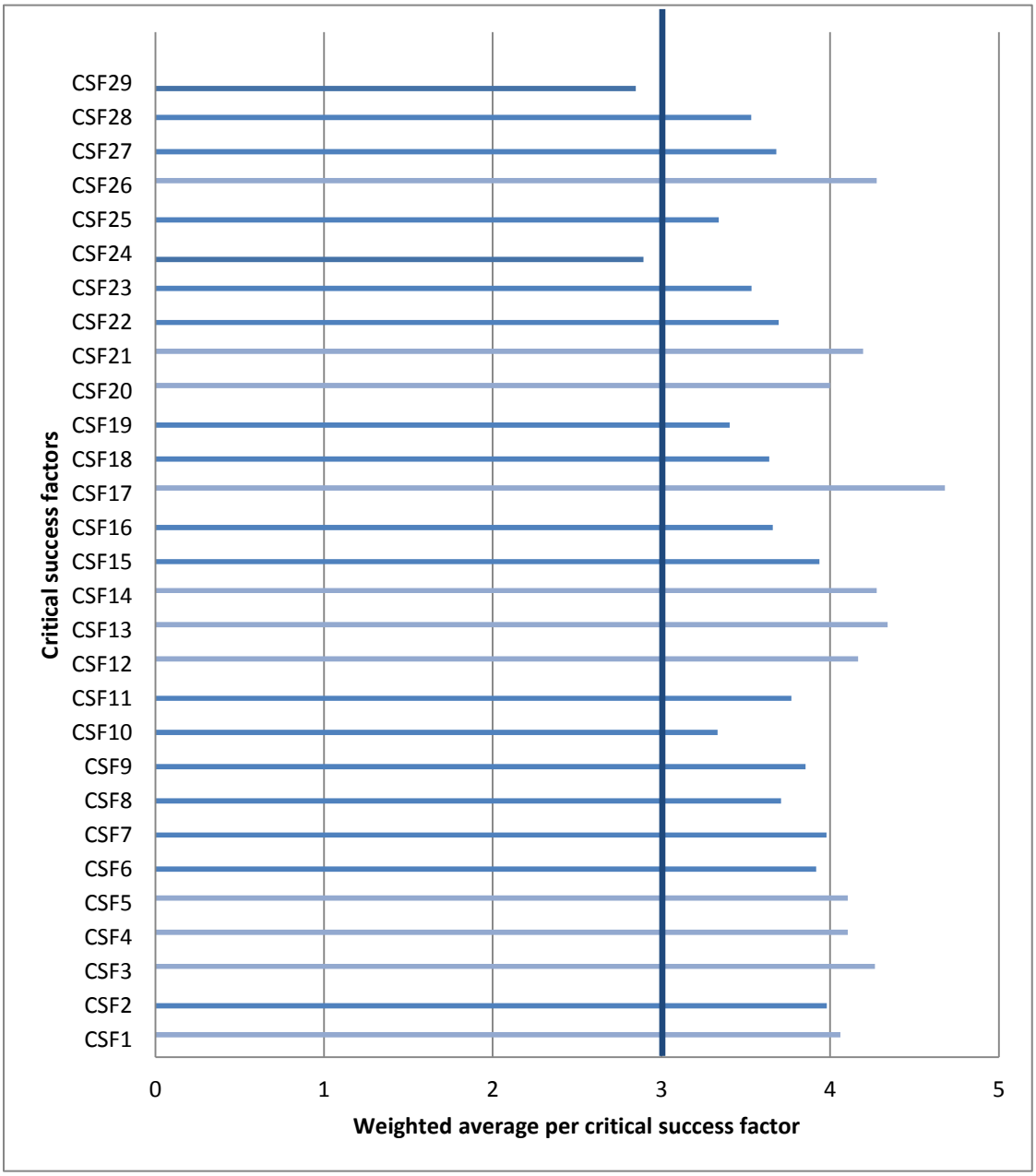

Figure 4.5: Critical success factor significance

Table 4.1: Likert scale rating and description

Value	Likert scale description
1	Neither critical nor important
2	Important not critical
3	Somewhat critical and important
4	Critical and important
5	Extremely critical and important

The results of the questionnaire per individual critical success factor are presented below. The detailed conclusions and findings resulting from the CSF ratings will be discussed later in Chapter five.

For the first CSF, of the respondents who answered the question on how critical and important it was to have a common understanding between business and IT of the risk strategy, over 78 per cent of the respondents thought that it was both critical as well as extremely critical and important, while only 16 per cent were of the opinion that it was somewhat critical and important (Table 4.2 below).

Table 4.2: Critical success factor 1

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	3 6%	8 16%	21 43%	17 35%	49
					answered question	**49**
					skipped question	**3**

A cumulative 79 per cent of the respondents thought that it was both critical as well as extremely critical and important to have a defined risk appetite, with 14 per cent considering this factor as only somewhat important and critical (Table 4.3 below).

Table 4.3: Critical success factor 2

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	3 6%	7 14%	27 55%	12 24%	49
					answered question	**49**
					skipped question	**3**

A minimum of 90 per cent of the respondents thought that it was critical as well as extremely critical and important to have well-defined and documented operational risk management policies, processes and procedures (Table 4.4 below).

Table 4.4: Critical success factor 3

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	0 0%	5 10%	26 53%	18 37%	49
					answered question	**49**
					skipped question	**3**

In response to the question on whether it was important and critical to have clear, realistic goals and objectives for the ORMS implementation, 85 per cent of the respondents thought that this was both critical as well as extremely critical and important, while 27 per cent felt that it was extremely critical and important (Table 4.5 below).

Table 4.5: Critical success factor 4

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	1 2%	6 13%	28 58%	13 27%	48
					answered question	**48**
					skipped question	**4**

A clear implementation strategy was seen as both critical as well as extremely critical and important by over 88 per cent of the respondents, while 25 per cent thought that a clear implementation strategy was extremely critical and important when implementing an ORMS (Table 4.6 below).

Table 4.6: Critical success factor 5

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	1 2%	5 10%	30 63%	12 25%	48
					answered question	**48**
					skipped question	**4**

In response to the question on how important and critical is was to have business unit and IT involvement in pre-project planning, 70 per cent of the respondents identified this as being critical and important, with 35 per cent feeling that this was extremely critical and important (Table 4.7 below).

Table 4.7: Critical success factor 6

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	1 2%	5 10%	8 17%	17 35%	17 35%	48
					answered question	**48**
					skipped question	**4**

A total of 77 per cent of the respondents felt that it was critical as well as extremely critical and important to have a clearly established project scope when engaging in an ORMS Implementation (Table 4.8 below).

Table 4.8: Critical success factor 7

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	1 2%	1 2%	9 19%	24 50%	13 27%	48
					answered question	**48**
					skipped question	**4**

A total of 67 per cent of respondents felt that it was critical as well as extremely critical and important that the ORMS was implemented enterprise-wide (Table 4.9 below).

Table 4.9: Critical success factor 8

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	2 4%	4 8%	10 21%	22 46%	10 21%	48
					answered question	**48**
					skipped question	**4**

In response to the question testing respondents' perceptions around whether it was critical and important to ensure adequate budget for project resources, 63 per cent thought that it was critical and important, while only 17 per cent thought that it was extremely critical and important (Table 4.10 below).

Table 4.10: Critical success factor 9

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	2 4%	1 2%	7 15%	30 63%	8 17%	48
					answered question	**48**
					skipped question	**4**

A total of 48 per cent of the respondents found it critical as well as extremely critical and important to have a cross-functional team consisting of the right mix of external consultants and internal staff on an ORMS implementation. Around 27 per cent found this somewhat critical and important (Table 4.11 below).

Table 4.11: Critical success factor 10

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	5 10%	7 15%	13 27%	13 27%	10 21%	48
					answered question	**48**
					skipped question	**4**

When examining whether it was important to have full-time team members, around 65 per cent of respondents thought that having full-time team members was both critical as well as extremely critical and important (Table 4.12 below).

Table 4.12: Critical success factor 11

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	5 10%	12 25%	20 42%	11 23%	48
					answered question	**48**
					skipped question	**4**

In response to the question about having an experienced project team with the right mix of business and technical skills, 88 per cent of respondents felt that it was both critical as well as extremely critical and important (Table 4.13 below).

Table 4.13: Critical success factor 12

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	0 0%	8 17%	24 50%	16 33%	48
					answered question	**48**
					skipped question	**4**

An overwhelming 94 per cent of respondents replied that it was critical and important as well as extremely critical and important to assign responsibility to one or several individuals for delivery of the project (Table 4.14 below).

Table 4.14: Critical success factor 13

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	1 2%	2 4%	24 51%	20 43%	47
					answered question	**47**
					skipped question	**5**

Almost all respondents (99 per cent) thought that it was both critical and important as well as extremely critical and important to have a competent project manager (Table 4.15 below).

Table 4.15: Critical success factor 14

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	1 2%	4 9%	23 49%	19 40%	47
					answered question	**47**
					skipped question	**5**

Of the respondents, 79 per cent thought that it was critical and important as well as extremely critical and important to have effective monitoring/control throughout the implementation life cycle (Table 4.16 below).

Table 4.16: Critical success factor 15

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	1 2%	9 19%	29 62%	8 17%	47
					answered question	**47**
					skipped question	**5**

Regarding CSF 16, 60 per cent of respondents thought that it was critical and important as well as extremely critical and important to have specified measures of project success (Table 4.17 below).

Table 4.17: Critical success factor 16

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	3 6%	16 34%	22 47%	6 13%	47
					answered question	**47**
					skipped question	**5**

In response to the question on whether it was important and critical to have a sponsor or champion from top management, 98 per cent of the respondents thought that this was critical and important, as well as extremely critical and important (Table 4.18 below).

Table 4.18: Critical success factor 17

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	0 0%	1 2%	13 28%	33 70%	47
					answered question	**47**
					skipped question	**5**

A documented and agreed team structure reflecting defined roles and responsibilities throughout the organisation as they relate to the project team, was found to be critical and important as well as extremely critical and important by 62 per cent of the respondents, while 23 per cent thought that it was somewhat critical and important (Table 4.19).

Table 4.19: Critical success factor 18

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	7 15%	11 23%	21 45%	8 17%	47
					answered question	**47**
					skipped question	**5**

A defined and documented organisational structure, which documents the interdepartmental roles/reporting relevant to the project, was deemed somewhat critical and important by 40 per cent of the respondents while 45 per cent thought that it was both critical and important as well as extremely critical and important (Table 4.20 below).

Table 4.20: Critical success factor 19

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	7 15%	19 40%	16 34%	5 11%	47
					answered question	**47**
					skipped question	**5**

Of the respondents, 75 per cent considered effective change management as being critical and important as well as extremely critical and important for an ORMS implementation. However, only 10 per cent considered it somewhat critical and important (Table 4.21 below).

Table 4.21: Critical success factor 20

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	2 4%	10 21%	21 45%	14 30%	47
					answered question	**47**
					skipped question	**5**

Effective and targeted communication was seen as critical and important as well as extremely critical and important by 82 per cent of the respondents (Table 4.22 below).

Table 4.22: Critical success factor 21

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	0 0%	1 2%	7 15%	20 43%	18 39%	46
					answered question	**46**
					skipped question	**6**

Ensuring that operational risk-related data was available in a single data repository was considered critical and important as well as extremely critical and important by 63 per cent or the respondents with 22 per cent considering it somewhat critical and important (Table 4.23 below).

Table 4.23: Critical success factor 22

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	1 2%	6 13%	10 22%	18 39%	11 24%	46
					answered question	**46**
					skipped question	**6**

In response to the question whether a documented data model was necessary for the successful implementation of an ORMS, 51 per cent of respondents considered this as both critical and important as well as extremely critical and important. Another 31 per cent of respondents were of the opinion that this was somewhat critical and important, while 13 per cent thought that this was important but not critical (Table 4.24 below).

Table 4.24: Critical success factor 23

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	2 4%	6 13%	14 31%	12 27%	11 24%	45
					answered question	**45**
					skipped question	**7**

Minimal customisation to the ORMS software was not considered as critical with only 19 per cent of respondents indicating that this was critical and important. The majority of respondents (45 per cent) were of the opinion that this was somewhat critical and important, with 26 per cent being of the opinion that this was important but not critical. Only six per cent of respondents thought that this was neither critical nor important (Table 4.25 below). With the majority of respondents considering this CSF as less than critical and important, CSF 24 was considered as a CSF in the implementation of an ORMS.

Table 4.25: Critical success factor 24

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	3 6%	12 26%	21 45%	9 19%	2 4%	47
					answered question	**47**
					skipped question	**5**

Ensuring that the ORMS system interfaced with the legacy systems and other applications of the bank was found to be critical and important as well as extremely critical and important by 43 per cent of the respondents. Another 40 per cent deemed this factor to be somewhat critical and important, with 13 per cent agreeing that it was important not critical, while four per cent were of the opinion that it was neither critical nor important (Table 4.26 below).

Table 4.26: Critical success factor 25

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	2 4%	6 13%	19 40%	14 30%	6 13%	47
					answered question	**47**
					skipped question	**5**

Conducting system testing prior to implementation was considered extremely critical and important by 49 per cent of the respondents, with a further 36 per cent considering this as critical and important (Table 4.27 below).

Table 4.27: Critical success factor 26

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	1 2%	1 2%	5 11%	17 36%	23 49%	47
					answered question	**47**
					skipped question	**5**

When asked how important and critical it was to have a vendor with past experience in similar implementations, 66 per cent responded that it was critical and important as well as extremely critical and important, while 15 per cent were of the opinion that this was somewhat critical and important (Table 4.28 below).

Table 4.28: Critical success factor 27

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	4 9%	5 11%	7 15%	17 36%	14 30%	47
					answered question	**47**
					skipped question	**5**

Having a flexible and configurable architectural framework was considered as critical and important as well as extremely critical and important by 53 per cent of the respondents, while 28 per cent were of the opinion that this was somewhat critical and important (Table 4.29 below).

Table 4.29: Critical success factor 28

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	1 2%	8 17%	13 28%	15 32%	10 21%	47
					answered question	**47**
					skipped question	**5**

The importance of having internal audit control throughout the implementation was found to be important but not critical by 30 per cent of the respondents with another 30 per cent considering this as somewhat important and critical. Only 29 per cent considered this as being critical and important as well as extremely critical and important (Table 4.30 below). As the majority of respondents considered this CSF as less than critical and important, it has not been considered as a CSF for the implementation of an ORMS.

Table 4.30: Critical success factor 29

Answer options	Neither critical nor important	Important not critical	Somewhat critical and important	Critical and important	Extremely critical and important	Response count
Select the most appropriate	5 11%	14 30%	14 30%	9 20%	4 9%	46
					answered question	**46**
					skipped question	**6**

The detailed findings per CSF confirm that of the 29 originally identified CSFs from the literature review, 27 were found to be critical and important by the survey respondents. Only two (CSF 24 and 29) were found to be somewhat critical and important or less and were thus not considered as a final CSF for this study.

4.2.2 Critical success category and factor prioritisation

Having examined the respondents' opinions to the individual CSFs, the survey proceeded to determine the respondents' prioritisation of the 14 identified CSF categories (originally defined in Table 2.3). Table 4.31 and Figure 4.6 below present the cumulative results of the prioritised CSF categories as per the respondents' feedback. The majority (62.7 per cent) of the respondents were of the opinion that the most important factor categories when considering an ORMS implementation were strategy and decision-makers' support from senior management. This indicated that the respondents recognised the strong need to have a definite and well-defined strategy around implementing an ORMS as well as support from senior management in order to execute a successful implementation of an operational risk management system.

The proceeding section will present the CSF category findings, while a more detailed analysis of the findings will be presented in Chapter five.

Performance monitoring and internal audit were found to be the lowest ranked CSF categories at 15.7 per cent. This indicated that the respondents did not consider the involvement of the internal audit department as critical to the success of an ORMS implementation. The low ranking of the performance monitoring category was surprising as the factors within the category were both considered as being critical and important as well as extremely critical and important.

Table 4.31: Prioritised critical success factor categories

Answer options	Response per cent	Response count
Strategy	62.7%	32
Decision-makers' support from senior management	62.7%	32
Governance	51.0%	26
Data	39.2%	20
Communication	37.3%	19
Change management	35.3%	18
Project resources	35.3%	18
Scope	33.3%	17
Project management	31.4%	16
Application	27.5%	14
Architecture	25.5%	13
Pre-project planning	23.5%	12
Performance monitoring	15.7%	8
Internal audit	15.7%	8

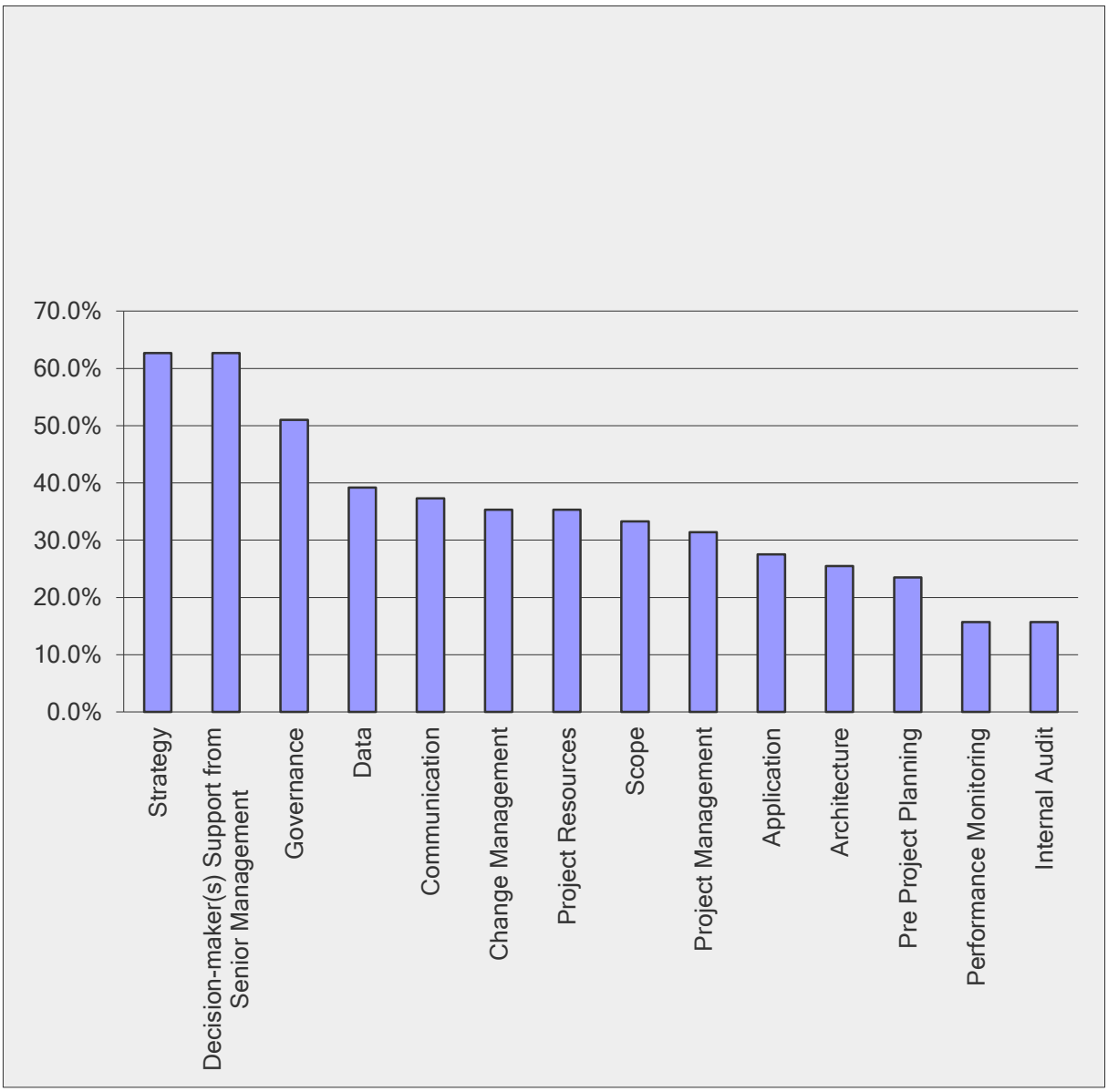

Figure 4.6: Prioritised critical success factor categories

For CSF categories with more than one CSF, respondents were asked to prioritise the CSFs against each other within the factor category by allocating a maximum of 100 points across the CSFs. The mean has been used to determine the relative ranking.

Table 4.32 and Figure 4.7 below present the results of the prioritised CSFs for the strategy category. Well-defined and documented operational risk management policies, processes and procedures were the highest prioritised CSF since it had the highest mean allocation of 37.89 across the CSFs.

Table 4.32: Prioritised critical success factors for the strategy category

Strategy	Number of respondents responded	Minimum allocation	Maximum allocation	Mean allocation	Standard deviation
Common understanding between business and IT of risk strategy	46	10.00	50.00	31.0652	11.82164
A defined risk appetite and tolerance	46	10.00	70.00	31.0435	11.08945
Well-defined and documented operational risk management policies, processes and procedures	46	10.00	70.00	37.8913	15.16169

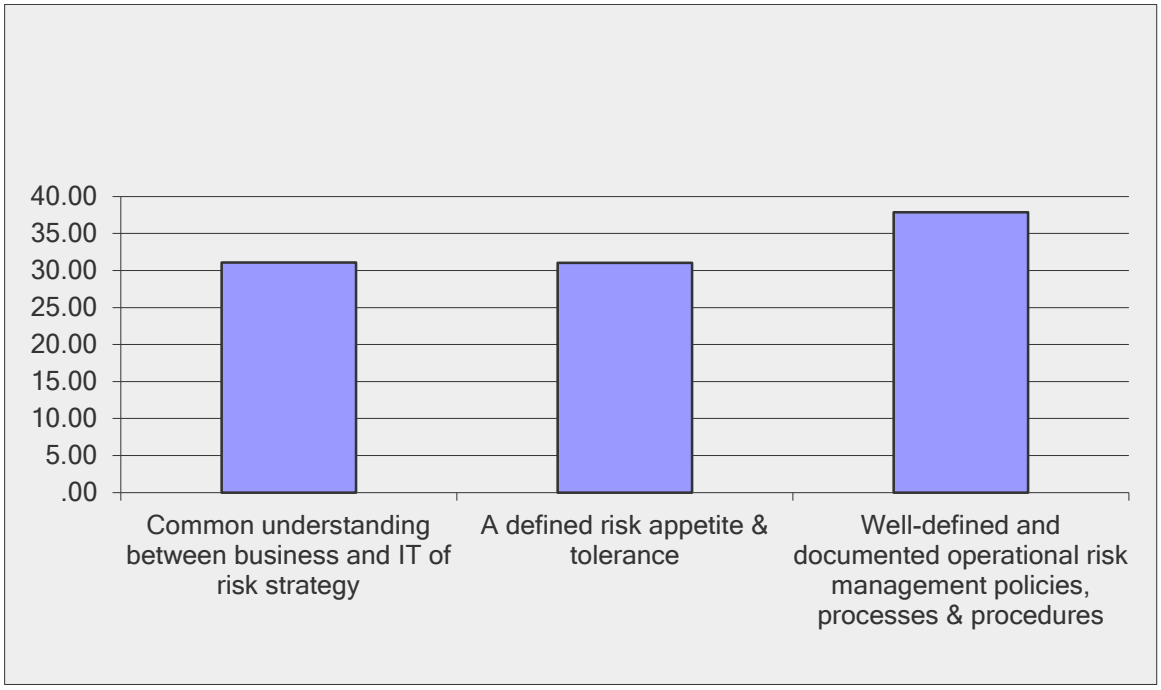

Figure 4.7: Prioritised critical success factors for strategy category

Table 4.33 and Figure 4.8 below present the results of the prioritised CSFs for the governance category. Documented and agreed project team structure was the highest priority since it had the highest mean allocation of 53.44 among the CSFs for this category.

Table 4.33: Prioritised critical success factors by governance category

Governance	Number of respondents responded	Minimum allocation	Maximum allocation	Mean allocation	Standard deviation
A documented and agreed project team structure	45	20.00	75.00	53.4444	10.80941
A defined and documented organisational structure	45	25.00	80.00	46.5556	10.80941

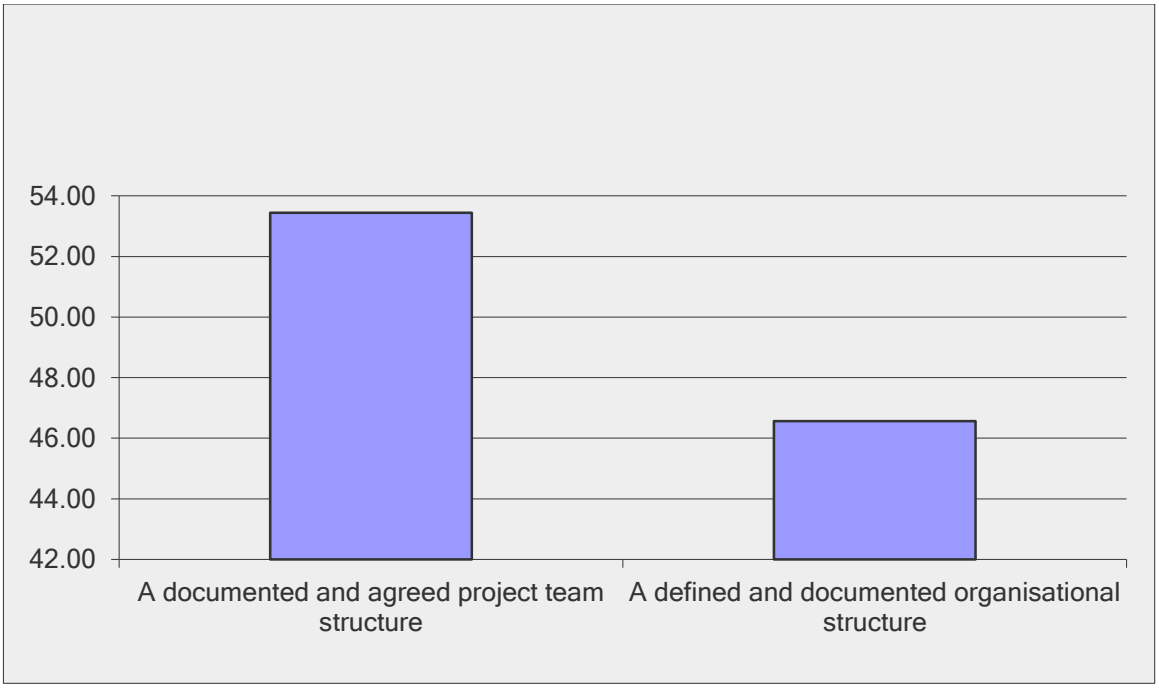

Figure 4.8: Prioritised critical success factors by governance category

Table 4.34 and Figure 4.9 below present the results of the prioritised CSFs for the data category. Ensure that operational risk-related data is available, cleansed and migrated to a single data repository was the highest priority with a mean allocation of 54.22.

Table 4.34: Prioritised critical success factors by data category

Data	Number of respondents responded	Minimum allocation	Maximum allocation	Mean allocation	Standard deviation
Ensure that operational risk-related data is available, cleansed and migrated to a single data repository	45	30.00	95.00	54.2222	14.01929
A documented data model	45	5.00	70.00	45.7778	14.01929

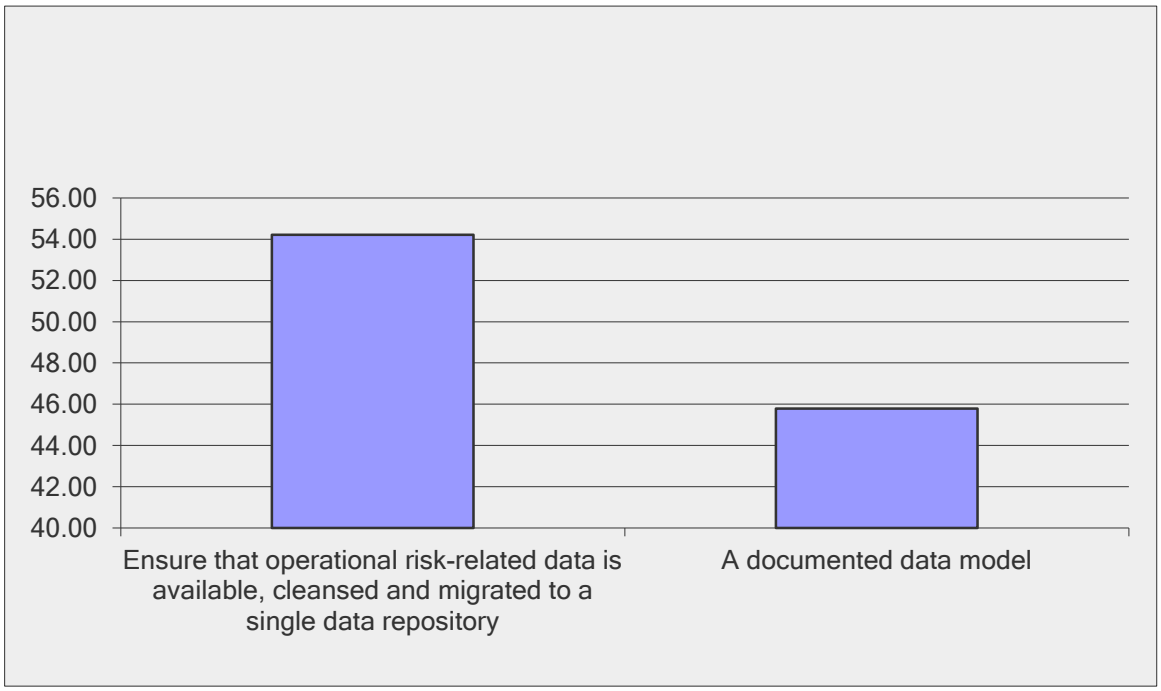

Figure 4.9: Prioritised critical success factors by governance category

Table 4.35 and Figure 4.10 below present the results of the prioritised CSFs for the project resources category. An experienced and adequately skilled project team was found to be the CSF with the highest mean allocation of 28.67, with adequate budget for project resources as a close second priority with a mean allocation of 26.48. The respondents considered the CSF of cross-functional team consisting of a mix of external consultants and internal staff as having the lowest priority with a mean allocation of just 20.22.

Table 4.35: Prioritised critical success factors by resource category

Project resources	Number of respondents responded	Minimum allocation	Maximum allocation	Mean allocation	Standard deviation
Adequate budget for project resources	46	10.00	50.00	26.4783	9.38495
Cross-functional team consisting of a mix of external consultants and internal staff	46	.00	40.00	20.2174	10.59122
Full-time team members	46	10.00	50.00	24.6304	9.52507
Experienced and adequately skilled project team	46	10.00	60.00	28.6739	10.33883

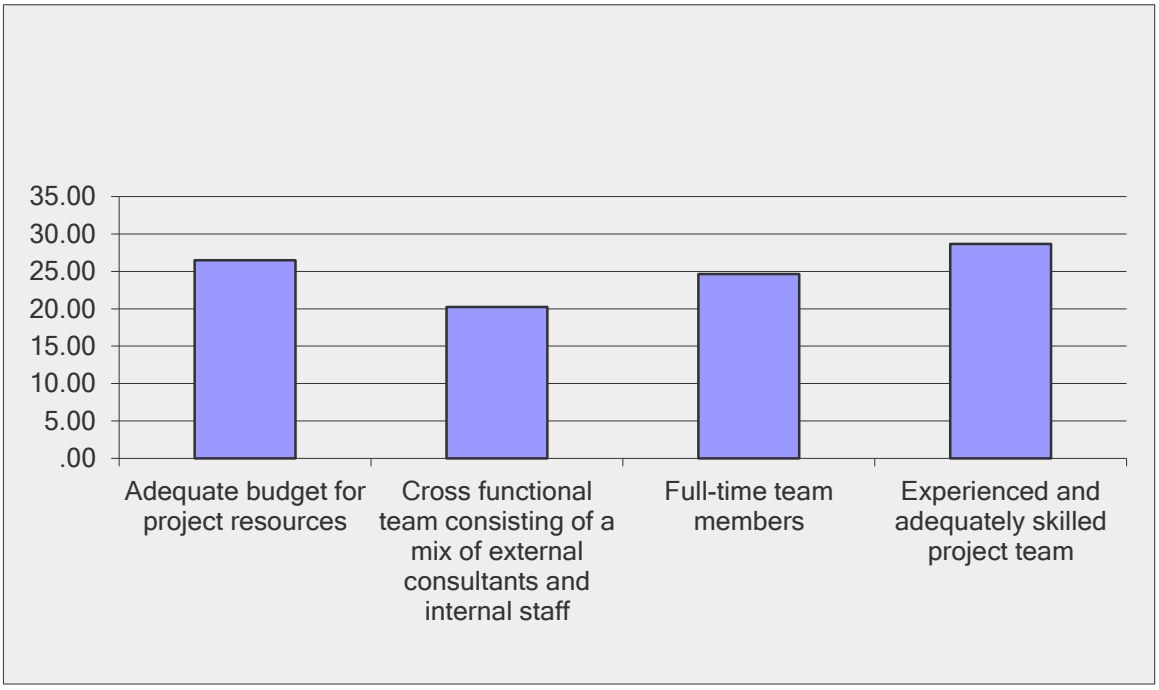

Figure 4.10: Prioritised critical success factors by resource category

Table 4.36 and Figure 4.11 below present the results of the prioritised CSFs for the scope category. A clearly established project scope received the highest priority by the respondents with a mean allocation of 56.84. An enterprise-wide implementation of an ORMS was found to be less of a priority with a mean allocation of 43.15.

Table 4.36: Prioritised critical success factors by scope category

Scope	Number of respondents responded	Minimum allocation	Maximum allocation	Mean allocation	Standard deviation
Clearly established project scope	46	20.00	90.00	56.8478	14.99477
ORMS implementation is enterprise-wide	46	10.00	80.00	43.1522	14.99477

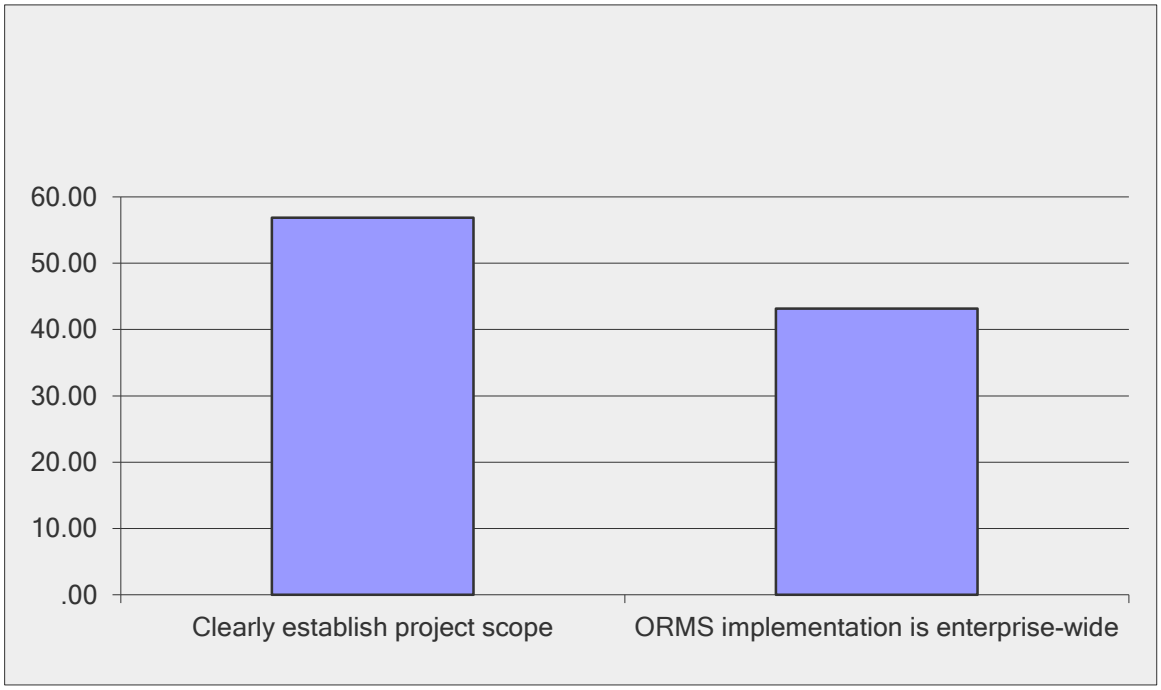

Figure 4.11: Prioritised critical success factors by scope category

Table 4.37 and Figure 4.12 below present the results of the prioritised CSFs for the project management category. Respondents were of the opinion that responsibility assigned was the highest priority CSF with a mean allocation of 50.76, although having a competent project manager was deemed almost as high a priority with a mean allocation of 49.24.

Table 4.37: Prioritised critical success factors by project management category

Project management	Number of respondents responded	Minimum allocation	Maximum allocation	Mean allocation	Standard deviation
Responsibility assigned	45	30.00	80.00	50.7556	11.91858
Competent project manager	45	20.00	70.00	49.2444	11.91858

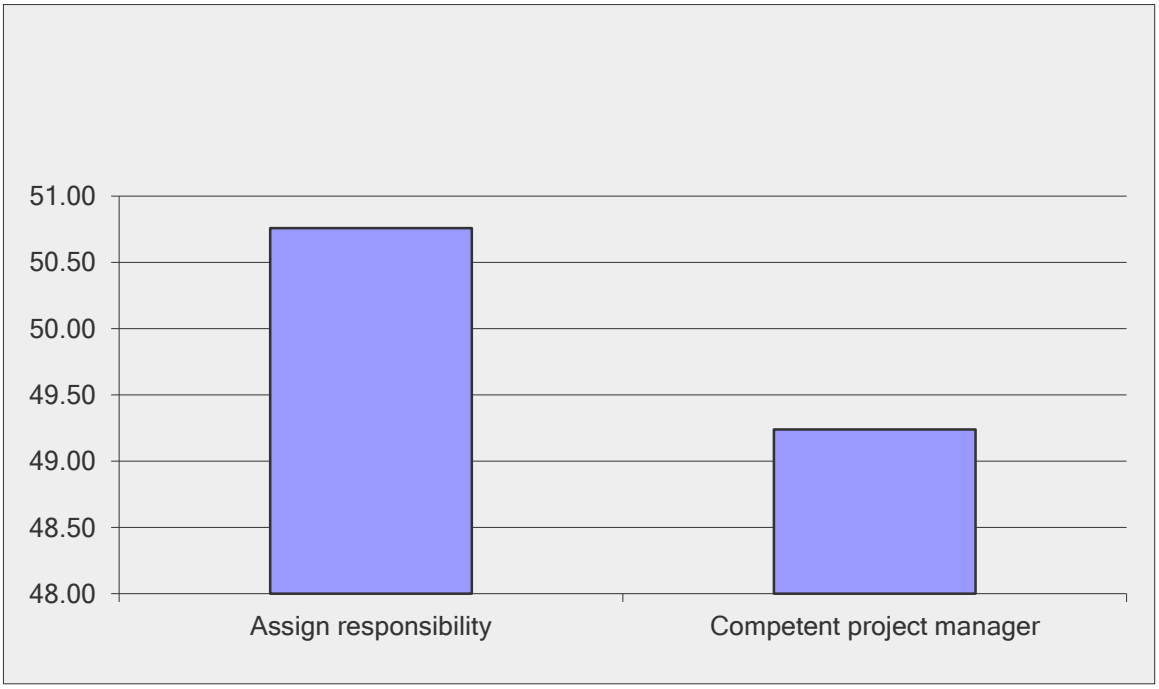

Figure 4.12: Prioritised critical success factors by project management category

Table 4.38 and Figure 4.13 below present the results of the prioritised CSFs for the application category. Conduct system testing prior to implementation was ranked as the highest priority by respondents with a mean allocation of 32.42. The other CSFs all received a similar prioritisation.

Table 4.38: Prioritised critical success factors by application category

Application	Number of respondents responded	Minimum allocation	Maximum allocation	Mean allocation	Standard deviation
Minimal customisation to the ORMS software	45	10.00	90.00	21.1111	14.05706
Ensure that the ORMS interfaces with legacy systems and other applications	45	2.00	60.00	22.0444	10.26458
Conduct system testing prior to implementation	45	4.00	55.00	32.4222	11.31871
Vendor support and past experience	45	.00	50.00	24.4222	11.87145

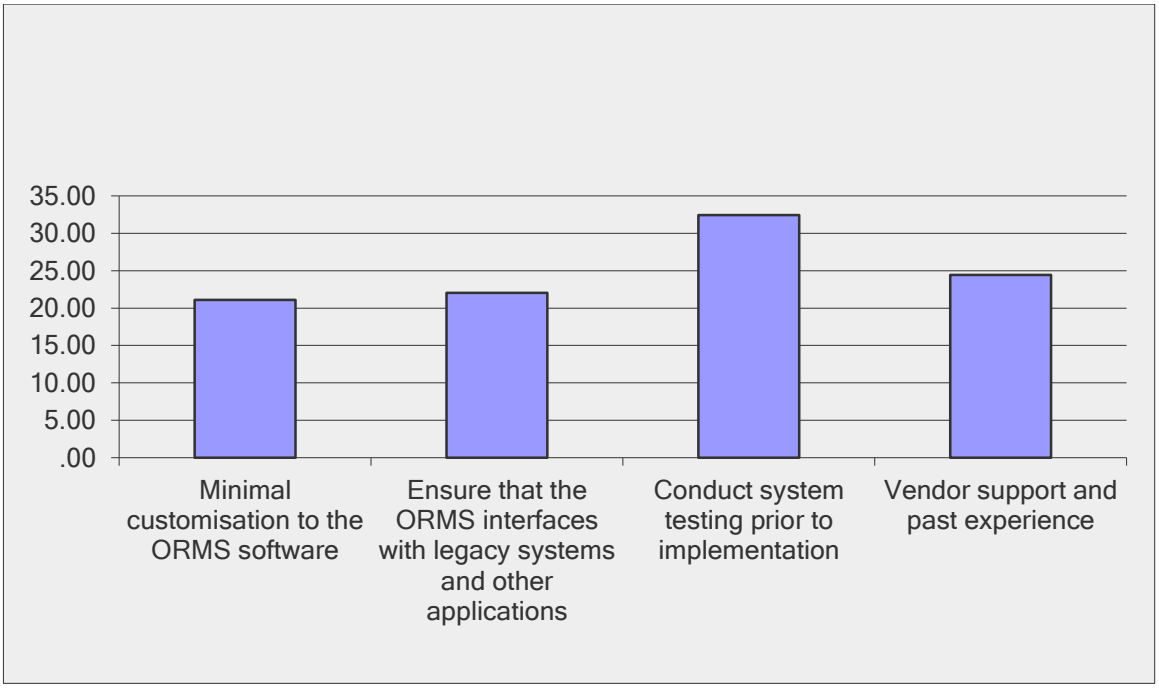

Figure 4.13 Prioritised critical success factors by application category

Table 4.39 and Figure 4.14 below present the results of the prioritised CSFs for the pre-project planning category. Clear realistic goals and objectives received the highest prioritisation from the respondents with a mean allocation of 39.53. The other two CSFs (a clear implementation strategy as well as business unit and IT involvement in pre-project planning) received similar prioritisation.

Table 4.39: Prioritised critical success factors by pre-project planning category

Pre-project planning	Number of respondents responded	Minimum allocation	Maximum allocation	Mean allocation	Standard deviation
Clear realistic goals and objectives	45	20.00	70.00	39.5333	11.38899
A clear implementation strategy	45	10.00	45.00	29.8889	8.82976
Business unit and IT involvement in pre-project planning	45	5.00	60.00	30.5778	12.38857

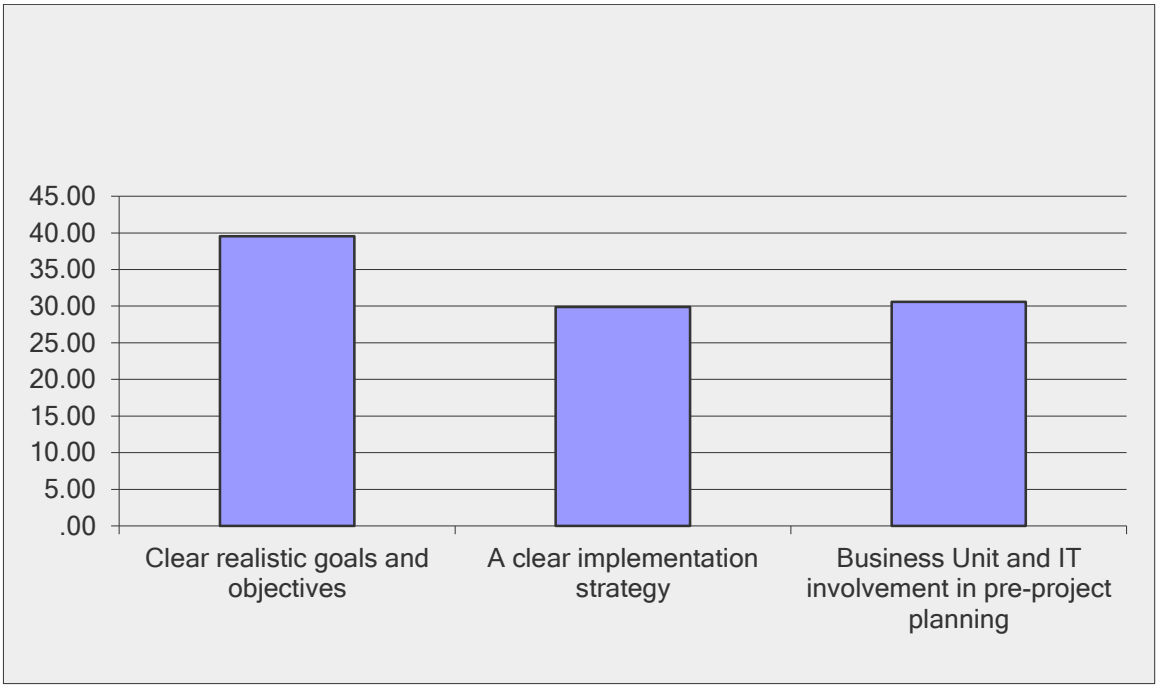

Figure 4.14: Prioritised critical success factors by pre-project planning category

Table 4.40 and Figure 4.15 below present the results of the prioritised CSFs for the performance monitoring category. Effective monitoring/control throughout the implementation life cycle was the highest prioritised CSF with a mean allocation of 54.56.

Table 4.40: Prioritised critical success factors by performance monitoring category

Performance monitoring	Number of respondents responded	Minimum allocation	Maximum allocation	Mean allocation	Standard deviation
Effective monitoring/control throughout the implementation life cycle	45	30.00	90.00	54.5556	10.91404
Specified measures of project success	45	10.00	70.00	45.4444	10.91404

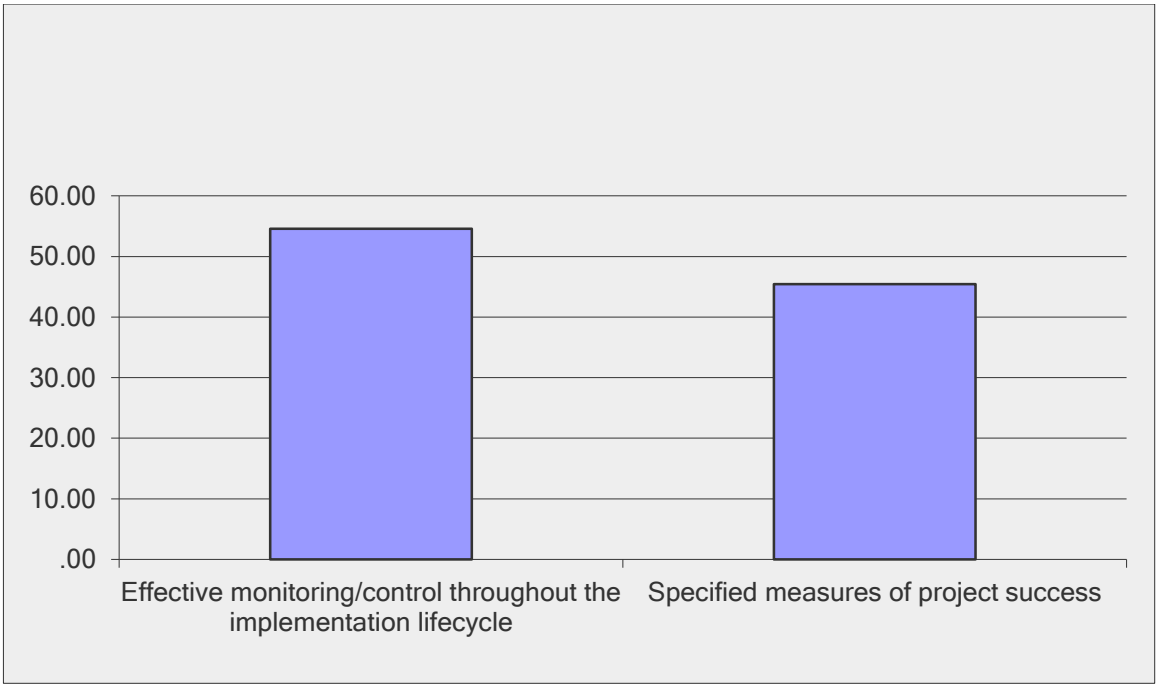

Figure 4.15: Prioritised critical success factors by performance monitoring category

The review of the respondents' perceptions on the importance and criticality of the 29 identified CSFs in combination with the prioritised CSF categories allowed for a consolidated and prioritised list of CSFs and categories to be produced in Table 4.41 below. Through examining the weighted averages in Figure 4.5, CSF 24 and 29 were not considered as important and critical and were thus not seen as critical success factors in the implementation of an ORMS.

Therefore, a final list of 27 critical success factors is presented in Table 4.41 below. From the consolidated analysis, having a well-defined and documented operational risk management policies processes and procedures was identified as the most important CSF. Conceptually, the logic is sound as having well-defined and documented policies, processes and procedures forms the basis from which to begin to understand and plan an ORMS implementation. Inaccurate or insufficient documentation would create a weak foundation for the ORMS and would limit the probability of a successful implementation.

Table 4.41: Final prioritised critical success factors

ID	CSF Category	CSF
1	**Strategy**	
1.1		Well-defined and documented operational risk management policies, processes and procedures
1.2		Common understanding of risk strategy between business and IT
1.3		Define risk appetite and tolerance
2	**Decision-makers' support from senior management**	
2.1		Project sponsor/champion from top management
		CRO required to drive change
		Active top management support throughout the implementation life cycle
		Empowered decision-makers
3	**Governance**	
3.1		Documented and agreed project team structure
		Creation of a project steering committee
		Clearly defined roles and responsibilities throughout the organisation (operational risk-related)
3.2		Defined and documented organisational structure
4	**Data**	
4.1		Data availability, migration, consolidation and cleaning
4.2		Data model
5	**Communication**	
5.1		Targeted and effective communication

ID	CSF Category	CSF
		Management of expectations at all levels
		Communication among key stakeholders
		Project progress communication
		Organisational adaptation/culture/structure
6	**Change management**	
6.1		Effective change management
		User/client involvement
		Training provision (budget, resources)
		End-user training
7	**Project resources**	
7.1		Experienced and adequately skilled project team
		Team should have both business and technical knowledge
7.2		Adequate budget
		Adequate compensation and incentives
		Linking output to management compensation
7.3		Full-time team members
7.4		Cross-functional team consisting of a mix of consultants and internal staff
8	**Scope**	
8.1		Clearly established project scope
		Clear and fixed statement of requirements
		Smaller project milestones
8.2		Enterprise-wide implementation
9	**Project management**	
9.1		Responsibility assigned
9.2		Competent project manager
10	**Application**	
10.1		System testing prior to implementation
10.2		Vendor support and past experience

ID	CSF Category	CSF
10.3		Interfaces with legacy systems and other applications
11	**Architecture**	
11.1		Flexible and configurable architectural framework
12	**Pre-project planning**	
12.1		Clear realistic goals and objectives
12.2		Business unit and IT involvement in pre-project planning
		Business unit involvement in early planning
12.3		Clear implementation strategy
13	**Performance monitoring**	
13.1		Effective monitoring/control throughout the implementation life cycle
		Strong/detailed plan kept up to date throughout the implementation life cycle
		Risks addressed/assessed/managed
		Maintaining initial project scope
13.2		Specified measures of success

4.2.3 Respondents' perceptions

To gain a deeper insight into whether any differences in the perceptions of the respondents existed, the Kruskal-Wallis (Welman *et al.* 2007:21) test was used to find significant differences. As outlined in Section 3.6 above, the Kruskal-Wallis test (Welman *et al.* 2007:21) was used to find significant differences in the data and was regarded as the non-parametric alternative to the regular one-way analysis of variance.

The test was carried out since the data was mostly ordinal and had three or more items per independent variable. For the test, the level of significance used was 0.05 (or five per cent).

Table 4.42 below presents the results based on the respondents' perception of how important and critical the following CSFs are when grouped according to the respondents' business type.

Having well-defined and documented operational risk management policies, processes and procedures, a clearly established project scope as well as effective change management were identified as the CSFs with significant differences when grouped according to the respondents' business type since their p-values were less than the 0.05 level of significance.

This implied that, as the respondents' business type changed, so did their perception of the three significant CSFs. The remaining CSFs did not have significant differences when grouped according to the business type. This signalled that there was no significant change in their perception of the remaining CSFs.

Table 4.42: Test for significance by business type

Category	Critical success factor	Chi-square	df	p-value
Strategy	How important and critical is it to have a common understanding between business and IT of the risk strategy?	3.179	3	0.365
	How important and critical is it to have a defined risk appetite?	0.863	3	0.834
	How important and critical is it to have well-defined and documented operational risk management policies, processes and procedures?	14.349	3	0.002
Pre-project planning	How important and critical is it to have clear, realistic goals and objectives (around the ORMS and what the implementation will achieve)?	5.057	3	0.168
	How important and critical is it to have a clear implementation strategy?	3.613	3	0.306
	How important and critical is it to have business unit and IT involvement in pre-project planning (business unit involvement in early planning phases)?	5.152	3	0.161
Scope	How important and critical is it to have a clearly established project scope (clear and fixed statement of requirements along with smaller project milestones)?	8.545	3	0.036
	How important and critical is it to ensure that the ORMS implementation is enterprise-wide?	4.272	3	0.234
Project resources	How important and critical is it to ensure an adequate budget for project resources (to cover in addition to the direct project costs, costs associated with project team performance incentives, e.g. project bonuses)?	1.841	3	0.606
	How important and critical is it to have a cross-functional team consisting of the right mix of external consultants and internal staff?	5.623	3	0.131
	How important and critical is it to have full-time (dedicating 100% of their time to the project) team members (assuming that they are adequately skilled)?	1.821	3	0.61
	How important and critical is it to have an experienced project team with the right mix of business and technical skills?	1.113	3	0.774

Category	Critical success factor	Chi-square	df	p-value
Project management	How important and critical is it to assign responsibility (to one or several individuals for delivery of the project)?	2.01	3	0.57
	How important and critical is it to have a competent project manager (both in terms of skill and leadership ability)?	3.816	3	0.282
Performance monitoring	How important and critical is it to have effective monitoring/control throughout the implementation life cycle (strong/detailed plan kept up to date throughout the implementation life cycle along with ensuring that risks are addressed/assessed/managed)?	1.783	3	0.619
	How important and critical is it to have specified measures of project success (predefined metrics to track and monitor the project's success against, e.g. a 40% decrease in a particular process time)?	2.083	3	0.555
Decision-makers' support from senior management	How important and critical is it to have a project sponsor/champion from top management (having the CRO, or equivalently empowered decision-maker, driving change along with active top management support throughout the implementation life cycle)?	1.586	3	0.663
Governance	How important and critical is it to have a documented and agreed project team structure (reflecting clearly defined roles and responsibilities throughout the organisation as they relate to the project team along with a defined project steering committee)?	0.445	3	0.931
	How important and critical is it to have a defined and documented organisational structure (an organisation-wide structure documenting interdepartmental roles/reporting lines that reflect the ORMS project's relationship/impact on this structure)?	6.901	3	0.075
Change management	How important and critical is it to ensure effective change management (focusing on user/client involvement throughout the implementation process along with adequate training)?	8.287	3	0.040
Communication	How important and critical is it to ensure targeted and effective communication (management of expectations at all levels along with communication among key stakeholders and continuous project progress communication)?	3.734	3	0.292
Data	How important and critical is it to ensure that operational risk-related data is available, in a single data repository?	0.262	3	0.967
	How important and critical is it to have a documented data model (conceptual, logical and physical data model for all data related to an ORMS)?	4.328	3	0.228
Application	How important and critical is it to have minimal customisation to the ORMS software (aligning the business processes to the software)?	5.743	3	0.125

Category	Critical success factor	Chi-square	df	p-value
	How important and critical is it to ensure that the ORMS interfaces with legacy systems and other applications?	2.125	3	0.547
	How important and critical is it to conduct system testing prior to implementation?	2.996	3	0.392
	How important and critical is it to have a vendor with past experience in a similar implementation?	2.151	3	0.542
Architecture	How important and critical is it to have a flexible and configurable architectural framework (architectural design of the ORMS solution)?	1.743	3	0.627
Internal audit	How important and critical is it to have internal audit control throughout implementation (the involvement of the internal audit department throughout the implementation life cycle)?	5.077	3	0.166

Table 4.43 below provides further insight into which of the business types found the significant factors more critical. Mean ranks were used to indicate relative priority.

Well-defined and documented operational risk management policies were found to be more critical and important for retail banks and wholesale banks than for private banks as well as consulting firms. A likely reason for this could be that retail and wholesale banks are generally exposed to a greater number of operational risks due to the nature of their businesses and hence would require well-defined and documented operational risk management policies.

Processes and procedures were noted as being more critical and important for retail banks and wholesale banks compared than for private banks and consulting firms. A likely reason for this could be that retail and wholesale banks are generally larger and more complex than private banks and consulting firms and therefore require policies, processes and procedures to a greater degree.

Clearly established project scope and effective change management were found to be more critical and important for retail banks than for private banks. One possible explanation could again be linked to the general size of the organisations, with retail banks typically being larger in terms of employees and departments than private banks. In this case, clearer project scope and effective change management would be more important in a large organisation.

Table 4.43: Statistically significant factors mean ranking for business type

Critical success factor	Business type	N	Mean rank
How important and critical is it to have well-defined and documented operational risk management policies, processes and procedures?	Retail bank	15	31.33
	Wholesale bank	6	31.33
	Private bank	5	14.10
	Consulting firm	21	19.02
	Total	47	
How important and critical is it to have a clearly established project scope (clear and fixed statement of requirements along with smaller project milestones)?	Retail bank	14	29.36
	Wholesale bank	6	17.92
	Private bank	5	12.20
	Consulting firm	21	23.88
	Total	46	
How important and critical is it to ensure effective change management (focusing on user/client involvement throughout the implementation process along with adequate training)?	Retail bank	13	28.81
	Wholesale bank	6	27.50
	Private bank	5	12.10
	Consulting firm	21	20.71
	Total	45	

No other CSFs showed any significant differences when grouped according to business type. This signalled that, if respondents' business type changed, there was no significant change in their perception of the remaining CSFs.

Table 4.44 below presents the results based on the respondents' perception of how important and critical the following CSFs are when grouped according to the respondents' answers as to whether or not they have implemented an ORMS.

Enterprise-wide, defined and documented organisational structure, as well as a documented data model was identified as the CSFs with significant differences when grouped according to the respondents' ORMS implementation status since their p-values were less than the 0.05 level of significance.

This implied that, as the respondents' implementation status changed, so did their perception of the three significant CSFs. No other CSFs showed significant differences when grouped according to implementation status. This signalled that there was no significant change in respondents' perception of the remaining CSFs.

Table 4.44: Test for significance by implementation status

Category	Critical success factor	Chi-square	df	p-value
Strategy	How important and critical is it to have a common understanding between business and IT of the risk strategy?	2.166	2	0.339
	How important and critical is it to have a defined risk appetite?	0.567	2	0.753
	How important and critical is it to have well-defined and documented operational risk management policies, processes and procedures?	0.129	2	0.938
Pre-project planning	How important and critical is it to have clear, realistic goals and objectives (around the ORMS and what the implementation will achieve)?	5.191	2	0.075
	How important and critical is it to have a clear implementation strategy?	0.136	2	0.934
	How important and critical is it to have business unit and IT involvement in pre-project planning (business unit involvement in early planning phases)?	0.977	2	0.613
Scope	How important and critical is it to have a clearly established project scope (clear and fixed statement of requirements along with smaller project milestones)?	0.192	2	0.908
	How important and critical is it to ensure that the ORMS implementation is enterprise-wide?	8.302	2	0.016
Project resources	How important and critical is it to ensure an adequate budget for project resources (to cover in addition to the direct project costs, costs associated with project team performance incentives, e.g. project bonuses)?	2.936	2	0.23
	How important and critical is it to have a cross-functional team consisting of the right mix of external consultants and internal staff?	1.984	2	0.371
	How important and critical is it to have full-time (dedicating 100% of their time to the project) team members (assuming that they are adequately skilled)?	3.254	2	0.197
	How important and critical is it to have an experienced project team with the right mix of business and technical skills?	2.895	2	0.235
Project management	How important and critical is it to assign responsibility (to one or several individuals for delivery of the project)?	2.706	2	0.258

Category	Critical success factor	Chi-square	df	p-value
	How important and critical is it to have a competent project manager (both in terms of skill and leadership ability)?	3.131	2	0.209
Performance monitoring	How important and critical is it to have effective monitoring/control throughout the implementation life cycle (strong/detailed plan kept up to date throughout the implementation life cycle along with ensuring that risks are addressed/assessed/managed)?	2.426	2	0.297
	How important and critical is it to have specified measures of project success (predefined metrics to track and monitor the project's success against, e.g. a 40% decrease in a particular process time)?	1.269	2	0.53
Decision-makers' support from senior management	How important and critical is it to have a project sponsor/champion from top management (having the CRO, or equivalently empowered decision-maker, driving change along with active top management support throughout the implementation life cycle)?	0.178	2	0.915
Governance	How important and critical is it to have a documented and agreed project team structure (reflecting clearly defined roles and responsibilities throughout the organisation as they relate to the project team along with a defined project steering committee)?	1.208	2	0.547
	How important and critical is it to have a defined and documented organisational structure (an organisation-wide structure documenting interdepartmental roles/reporting lines that reflect the ORMS project's relationship/impact on this structure)?	8.374	2	0.015
Change management	How important and critical is it to ensure effective change management (focusing on user/client involvement throughout the implementation process along with adequate training)?	1.564	2	0.457
Communication	How important and critical is it to ensure targeted and effective communication (management of expectations at all levels along with communication among key stakeholders and continuous project progress communication)?	0.831	2	0.66
Data	How important and critical is it to ensure that operational risk-related data is available, in a single data repository?	4.649	2	0.098
	How important and critical is it to have a documented data model (conceptual, logical and physical data model for all data related to an ORMS)?	8.906	2	0.012
Application	How important and critical is it to have minimal customisation to the ORMS software (aligning the business processes to the software?	0.789	2	0.674
	How important and critical is it to ensure that the ORMS interfaces with legacy systems and other applications?	0.813	2	0.666

Category	Critical success factor	Chi-square	df	p-value
	How important and critical is it to conduct system testing prior to implementation?	2.386	2	0.303
	How important and critical is it to have a vendor with past experience in a similar implementation?	4.484	2	0.106
Architecture	How important and critical is it to have a flexible and configurable architectural framework (architectural design of the ORMS solution)?	0.251	2	0.882
Internal audit	How important and critical is it to have internal audit control throughout implementation (the involvement of the internal audit department throughout the implementation life cycle)?	1.067	2	0.586

Table 4.45 below provides further insight into which of the implementation statuses found the significant factors more critical. The mean ranks indicated that banks that did not have current plans to implement an ORMS, agreed that it is less important and critical for them to implement an ORMS enterprise-wide compared to banks that planned to implement or have implemented an ORMS. This result indicates that experienced ORMS implementers understand the importance of implementing an ORMS system at an enterprise-wide level.

Banks that have implemented an ORMS found it more critical and important to define and document the organisational structure for the ORMS implementation than banks that have not or do not plan to implement an ORMS. The results seemed to confirm that an experienced ORMS implementer has a deeper appreciation and understanding of the importance of documenting the organisational structure compared to inexperienced implementers.

A documented data model was found to be more critical and important by organisations that were planning to implement an ORMS compared to those that had or were not planning to implement an ORMS. The result seemed to imply that in reality a documented data model was not as important as might have been perceived prior to implementation.

Table 4.45: Statistically significant factors mean ranking for implementation status

Critical success factor	Which of the following statements around implementing an ORMS best fits your organisation?	N	Mean rank
How important and critical is it to ensure that the ORMS implementation is enterprise-wide?	We have implemented an ORMS	24	28.48
	We plan to implement an ORMS	12	23.25
	We have no current plans to implement an ORMS	11	15.05
	Total	47	
How important and critical is it to have a defined and documented organisational structure (an organisation-wide structure documenting interdepartmental roles/reporting lines that reflect the ORMS project's relationship/impact on this structure)?	We have implemented an ORMS	24	28.54
	We plan to implement an ORMS	11	19.82
	We have no current plans to implement an ORMS	11	16.18
	Total	46	
How important and critical is it to have a documented data model (conceptual, logical and physical data model for all data) related to an ORMS)	We have implemented an ORMS	24	24.38
	We plan to implement an ORMS	11	27.23
	We have no current plans to implement an ORMS	9	11.72
	Total	44	

Table 4.46 below presents the results based on the respondents' perception of how important and critical the following CSFs are when grouped according to the respondent's title and position.

Having a cross-functional team consisting of the right mix of external consultants and internal staff was the only CSF with significant differences when grouped according to the respondent's title/position since its p-value was less than the 0.05 level of significance. This implied that the CRO and the IT project manager found this factor less important and critical when compared to the other positions. No other CSFs showed any significant differences when grouped according to the title/position. This signalled that, if respondents' title/position changed, there was no significant change in their perception of the remaining CSFs.

Table 4.46: Test for significance by title/position

Category	Critical success factor	Chi-square	df	p-value
Strategy	How important and critical is it to have a common understanding between business and IT of the risk strategy?	10.56	6	0.103
	How important and critical is it to have a defined risk appetite?	8.635	6	0.195
	How important and critical is it to have well-defined and documented operational risk management policies, processes and procedures?	9.864	6	0.131
Pre-project planning	How important and critical is it to have clear, realistic goals and objectives (around the ORMS and what the implementation will achieve)?	1.907	6	0.928
	How important and critical is it to have a clear implementation strategy?	5.729	6	0.454
	How important and critical is it to have business unit and IT involvement in pre-project planning (business unit involvement in early planning phases)?	12.47	6	0.052
Scope	How important and critical is it to have a clearly established project scope (clear and fixed statement of requirements along with smaller project milestones)?	8.069	6	0.233
	How important and critical is it to ensure that the ORMS implementation is enterprise-wide?	4.935	6	0.552
Project resources	How important and critical is it to ensure an adequate budget for project resources (to cover in addition to the direct project costs, costs associated with project team performance incentives, e.g. project bonuses)?	7.078	6	0.314
	How important and critical is it to have a cross-functional team consisting of the right mix of external consultants and internal staff?	14.79	6	0.022
	How important and critical is it to have full-time (dedicating 100% of their time to the project) team members (assuming that they are adequately skilled)?	5.919	6	0.432
	How important and critical is it to have an experienced project team with the right mix of business and technical skills?	4.37	6	0.627
Project Management	How important and critical is it to assign responsibility (to one or several individuals for delivery of the project)?	2.118	6	0.909
	How important and critical is it to have a competent project manager (both in terms of skill and leadership ability)?	4.566	6	0.601
Performance monitoring	How important and critical is it to have effective monitoring/control throughout the implementation life cycle (strong/detailed plan kept up to date throughout the implementation life cycle along with ensuring that risks are	4.186	6	0.651

Category	Critical success factor	Chi-square	df	p-value
	addressed/assessed/managed)?			
	How important and critical is it to have specified measures of project success (predefined metrics to track and monitor the project's success against, e.g. a 40% decrease in a particular process time)?	10.899	6	0.092
Decision-makers' support from senior management	How important and critical is it to have a project sponsor/champion from top management (having the CRO, or equivalently empowered decision-maker, driving change along with active top management support throughout the implementation life cycle)?	3.593	6	0.731
Governance	How important and critical is it to have a documented and agreed project team structure (reflecting clearly defined roles and responsibilities throughout the organisation as they relate to the project team along with a defined project steering committee)?	3.233	6	0.779
	How important and critical is it to have a defined and documented organisational structure (an organisation-wide structure documenting interdepartmental roles/reporting lines that reflect the ORMS project's relationship/impact on this structure)?	4.661	6	0.588
Change management	How important and critical is it to ensure effective change management (focusing on user/client involvement throughout the implementation process along with adequate training)?	9.214	6	0.162
Communication	How important and critical is it to ensure targeted and effective communication (management of expectations at all levels along with communication among key stakeholders and continuous project progress communication)?	6.516	6	0.368
Data	How important and critical is it to ensure that operational risk-related data is available, in a single data repository?	4.025	6	0.673
	How important and critical is it to have a documented data model (conceptual, logical and physical data model for all data related to an ORMS)?	9.432	6	0.151
Application	How important and critical is it to have minimal customisation to the ORMS software (aligning the business processes to the software?	5.69	6	0.459
	How important and critical is it to ensure that the ORMS interfaces with legacy systems and other applications?	3.225	6	0.78
	How important and critical is it to conduct system testing prior to implementation?	4.774	6	0.573
	How important and critical is it to have a vendor with past experience in a similar implementation?	9.513	6	0.147
Architecture	How important and critical is it to have a flexible and configurable architectural framework (architectural design of the ORMS solution)?	4.545	6	0.603

Category	Critical success factor	Chi-square	df	p-value
Internal audit	How important and critical is it to have internal audit control throughout implementation (the involvement of the internal audit department throughout the implementation life cycle)?	6.404	6	0.379

Table 4.47 below provides further insight into which of the titles or positions found the significant factor more critical. Analysis into the mean ranks indicated that the CRO (mean rank = 8.5) and the IT project lead (mean rank = 3) feels that having a cross-functional team consisting of the right mix of external consultants and internal staff is less important and critical when compared to the other titles or positions.

Table 4.47: Statistically significant factors mean ranking for title/position

Critical success factor	Title/position	N	Mean rank
How important and critical is it to have a cross-functional team consisting of the right mix of external consultants and internal staff?	Chief risk officer (CRO)	4	8.50
	Risk manager	21	24.17
	Internal consultant	1	32.00
	External consultant	11	33.05
	Project/team leader	4	31.25
	IT project leader	1	3.00
	Other	6	18.50
	Total	48	

Table 4.48 below presents the results based on the respondents' perception of how important and critical the following CSFs are when grouped according to the respondents' years of experience in implementing an ORMS.

Having an experienced project team with the right mix of business and technical skills along with a flexible and configurable architectural framework was found to be significant. No other CSFs showed significant differences when grouped according to years of experience. This signalled that as respondents' experience changed, this generated no significant change in their perception of the remaining CSFs.

Table 4.48: Test for significance by years of experience in ORMS implementation

Category	Critical success factor	Chi-square	df	p-value
Strategy	How important and critical is it to have a common understanding between business and IT of the risk strategy?	4.267	4	0.371
	How important and critical is it to have a defined risk appetite?	5.766	4	0.217
	How important and critical is it to have well-defined and documented operational risk management policies, processes and procedures?	4.505	4	0.342
Pre-project planning	How important and critical is it to have clear, realistic goals and objectives (around the ORMS and what the implementation will achieve)?	3.355	4	0.5
	How important and critical is it to have a clear implementation strategy?	1.286	4	0.864
	How important and critical is it to have business unit and IT involvement in pre-project planning (business unit involvement in early planning phases)?	3.187	4	0.527
Scope	How important and critical is it to have a clearly established project scope (clear and fixed statement of requirements along with smaller project milestones)?	1.274	4	0.866
	How important and critical is it to ensure that the ORMS implementation is enterprise-wide?	1.225	4	0.874
Project resources	How important and critical is it to ensure an adequate budget for project resources (to cover in addition to the direct project costs, costs associated with project team performance incentives, e.g. project bonuses)?	6.357	4	0.174
	How important and critical is it to have a cross-functional team consisting of the right mix of external consultants and internal staff?	4.885	4	0.299
	How important and critical is it to have full-time (dedicating 100% of their time to the project) team members (assuming that they are adequately skilled)?	3.734	4	0.443
	How important and critical is it to have an experienced project team with the right mix of business and technical skills?	10.617	4	0.031
Project management	How important and critical is it to assign responsibility (to one or several individuals for delivery of the project)?	4.235	4	0.375
	How important and critical is it to have a competent project manager (both in terms of skill and leadership ability)?	7.95	4	0.093
Performance monitoring	How important and critical is it to have effective monitoring/control throughout the implementation life cycle (strong/detailed plan kept up to date throughout the implementation life cycle along with ensuring that risks are	3.124	4	0.537

Category	Critical success factor	Chi-square	df	p-value
	addressed/assessed/managed)?			
	How important and critical is it to have specified measures of project success (predefined metrics to track and monitor the project's success against, e.g. a 40% decrease in a particular process time)?	5.608	4	0.23
Decision-makers' support from senior management	How important and critical is it to have a project sponsor/champion from top management (having the CRO, or equivalently empowered decision-maker, driving change along with active top management support throughout the implementation life cycle)?	4.979	4	0.289
Governance	How important and critical is it to have a documented and agreed project team structure (reflecting clearly defined roles and responsibilities throughout the organisation as they relate to the project team along with a defined project steering committee)?	7.679	4	0.104
	How important and critical is it to have a defined and documented organisational structure (an organisation-wide structure documenting interdepartmental roles/reporting lines that reflect the ORMS project's relationship/impact on this structure)?	7.424	4	0.115
Change management	How important and critical is it to ensure effective change management (focusing on user/client involvement throughout the implementation process along with adequate training)?	7.018	4	0.135
Communication	How important and critical is it to ensure targeted and effective communication (management of expectations at all levels along with communication among key stakeholders and continuous project progress communication)?	4.711	4	0.318
Data	How important and critical is it to ensure that operational risk-related data is available, in a single data repository?	4.677	4	0.322
	How important and critical is it to have a documented data model (conceptual, logical and physical data model for all data related to an ORMS)?	4.501	4	0.342
Application	How important and critical is it to have minimal customisation to the ORMS software (aligning the business processes to the software?	5.748	4	0.219
	How important and critical is it to ensure that the ORMS interfaces with legacy systems and other applications?	2.4	4	0.663
	How important and critical is it to conduct system testing prior to implementation?	5.605	4	0.231
	How important and critical is it to have a vendor with past experience in a similar implementation?	5.069	4	0.28
Architecture	How important and critical is it to have a flexible and configurable architectural framework (architectural design of the ORMS solution)?	16.254	4	0.003

Category	Critical success factor	Chi-square	df	p-value
Internal audit	How important and critical is it to have internal audit control throughout implementation (the involvement of the Internal Audit department throughout the implementation life cycle)?	1.967	4	0.742

Table 4.49 below provides further insight into how the number of years of experience influenced the significant critical success factors. Further analysis revealed that the respondents who had between one and five years of experience found having an experienced project team less critical and important than those who had more than five years of experience as well as less than one year.

The architectural design of the ORMS solution was found to be significant, with respondents with less than one year of experience as well as more than five years of experience finding it less critical and important than those who had between one and five years of experience.

Table 4.49: Statistically significant factors' mean ranking for years of experience in ORMS implementation

Critical success factor	Years of experience in operational risk management system implementation	N	Mean rank
How important and critical is it to have an experienced project team with the right mix of business and technical skills?	No experience	7	21.07
	Less than 1 year	7	34.79
	Between 1 and 3 years	4	16.50
	Between 3 and 5 years	13	18.65
	More than 5 years	17	28.03
	Total	48	
How important and critical is it to have a flexible and configurable architectural framework (architectural design of the ORMS solution)?	No experience	6	10.75
	Less than 1 year	7	35.36
	Between 1 and 3 years	4	27.00
	Between 3 and 5 years	13	29.69
	More than 5 years	17	18.94
	Total	47	

4.3 CONCLUSION

This chapter dealt with the statistical analysis of the research according to the methodology that was outlined in Chapter three. A total of 52 questionnaires were completed (68 per cent response rate) by the target group of financial institutions identified in Chapter three. This response was out of an approximate total population of 76 respondents. The questionnaire was divided into two main sections: first, a general information section about the respondents and their organisation, and second, the questionnaire around the CSFs for implementing an ORMS.

Results from the general information section of the questionnaire revealed that the respondents came mostly from retail banks and IT consulting firms and that the majority had implemented or were planning to implement an ORMS. The study also found that most of the respondents were risk managers within their respective organisations and that over half of them had more than three years of experience in this field.

To determine the significance of the 29 critical success factors identified through the literature review, the respondents were asked in the second part of the questionnaire to rate each CSF from “Neither critical nor important” to “Extremely critical and important”. The study found that, with the exception of two, all of the CSFs identified through the literature review were considered critical and important for the implementation of an ORMS by the respondents.

Having examined the respondents’ opinions to the individual CSFs, the survey proceeded to determine the respondents’ prioritisation of the 14 identified CSF categories. Once determined, the respondents were asked to prioritise the CSFs within a particular category to yield a final prioritised ORMS critical success factor list.

The end of the chapter examined the differences in the respondents’ perceptions across the range of respondent demographics. Significance tests were conducted across each demographic type. Analysis of respondents indicated that, for the largest part, the range of respondents had similar perceptions around the identified CSFs. CSFs that were found to be significantly different across a particular respondent’s demographic were ranked according to their mean to understand a particular priority across the demographic.

CHAPTER 5

FINDINGS AND CONCLUSIONS

5.1 INTRODUCTION

The objective of the research was to identify a list of critical success factors relevant for an operational risk management system implementation within a South African financial services organisation.

To achieve this, a two-step approach was adopted. First, a literature review was conducted to understand which CSFs existed in the current academic literature. Second, once a base set of CSFs had been defined, these were challenged by means of a research survey.

This chapter firstly provides a summary of the literature review and research. Secondly, the findings and conclusions are presented. Finally, limitations and recommendations for further study into CSFs for ORMS implementations are set out.

5.2 LITERATURE AND EMPIRICAL RESEARCH SUMMARY

Operational risk and its management have been under increased focus over the last few years as a result of the Basel II Capital Accord. In response, IT software vendors have begun developing sophisticated operational risk management systems. It was found that typically, an operational risk management system is a combination of two primary technologies: operational risk engines and qualitative risk self-assessments. These technologies are used to manage the process of risk assessment, risk decision-making, and the implementation of risk controls.

The academic literature revealed that IT projects have high failure rates, and that these high failure rates are caused in part by the multitude of factors and expertise that need to be successfully controlled and mastered throughout a project implementation. To increase the probability of a successful implementation, project managers must understand technical issues such as system development and process re-engineering. Organisational focus areas such as change management and end-user involvement are also of significant importance. These factors and areas of expertise were found to be defined by practitioners and researchers as critical success factors.

With high project failure rates, it was the objective of this study to identify the CSFs needed for a successful ORMS implementation. By defining a set of CSFs prior to implementation, it was envisaged that the project's management would be provided with an understanding of key activities and factors on which to focus prior to project mobilisation and throughout the project implementation life cycle.

A literature review to determine the critical success factors necessary to ensure a successful ORMS implementation was performed. The literature review focused on four distinct areas in order to establish a list of critical success factors that would be relevant to an ORMS implementation. The key critical success factors identified from each of the four areas are presented below:

1) General IT project focus area

The review centred on IT implementations in general and identified several critical success factors common across all types of IT projects. The most notable were:

- sound system implementation methodology
- clear realistic goals and objectives
- strong business case/sound basis for the project
- clear and fixed statement of requirements
- smaller project milestones
- proven/familiar technology
- adequate budget
- skilled/suitably qualified/sufficient staff/team
- experienced project team
- competent project manager
- strong/detailed plan kept up to date throughout the implementation life cycle
- risks addressed/assessed/managed
- effective monitoring/control throughout the implementation life cycle
- project sponsor/champion from top management
- user/client involvement
- effective change management
- training provision (budget, resources)

- management of expectations at all levels
- targeted and effective communication
- political stability
- environmental influences
- organisational adaptation/culture/structure
- data availability, migration, consolidation and cleaning
- data model

2) Enterprise resource planning focus area

The literature review extended to include large and complex organisational IT project implementations through a focus on CSFs associated with ERP implementations. The key CSFs identified were:

- top management setting policies to establish new system
- clear realistic goals and objectives
- strong business case/sound basis for the project
- clear and fixed statement of requirements
- clear implementation strategy
- clearly established project scope
- cross-functional team consisting of a mix of consultants and internal staff
- team should have both business and technical knowledge
- adequate compensation and incentives
- making use of adequately skilled consultants
- full-time team members
- experienced project team
- responsibility assigned
- competent project manager
- strong/detailed plan kept up to date throughout the implementation life cycle
- risks addressed/assessed/managed
- maintaining initial project scope

- effective monitoring/control throughout the implementation life cycle
- specified measures of success
- project sponsor/champion from top management
- active top management support throughout the implementation life cycle
- empowered decision-makers
- documented and agreed project team structure
- creation of a project steering committee
- user/client involvement
- effective change management
- training provision (budget, resources)
- end-user training
- management of expectations at all levels
- targeted and effective communication
- communication among key stakeholders
- project progress communication
- end-user input
- organisational adaptation/culture/structure
- data availability, migration, consolidation & cleaning
- minimal customisation to the software
- interfaces with legacy systems and other applications
- system testing prior to implementation
- vendor support and past experience
- aligning the business processes to the software or vice versa
- flexible and configurable architectural framework
- internal audit control throughout implementation

3) Enterprise risk management focus area

ERM implementations were examined to determine whether there were any risk-specific CSFs. Key CSFs identified were:

- linking output to management compensation
- top management setting policies to establish new system
- defining risk appetite and tolerance
- well-defined and documented operational risk management policies, processes and procedures
- common understanding of risk strategy between business and IT
- clear realistic goals and objectives
- clear implementation strategy
- IT involvement in pre-project planning
- enterprise-wide implementation
- cross-functional team consisting of a mix of consultants and internal staff
- adequate compensation and incentives
- full-time team members
- competent project manager
- effective monitoring/control throughout the implementation life cycle
- CRO required to drive change
- project sponsor/champion from top management
- active top management support throughout the implementation life cycle
- clearly defined roles and responsibilities throughout the organisation (operational risk-related)
- user/client involvement
- effective change management
- training provision (budget, resources)
- end-user training
- targeted and effective communication
- data availability, migration, consolidation and cleaning

- data model
- vendor support and past experience
- aligning the business processes to the software or vice versa
- flexible and configurable architectural framework
- internal audit control throughout implementation

4) Operational risk focus area

The research conducted in this study revealed no specific academic literature on ORMS implementation CSFs, and thus a more general literature review on operational risk was conducted. The literature review revealed that all of the operational risk-specific CSFs identified had already been highlighted in the previous literature review focus areas. The most prominent CSFs identified were:

- top management setting policies to establish new system
- defining risk appetite and tolerance
- well-defined and documented operational risk management policies, processes and procedures
- common understanding of risk strategy between business and IT
- clear implementation strategy
- IT involvement in pre-project planning
- business unit involvement in early planning
- project sponsor/champion from top management
- empowered decision-makers
- clearly defined roles and responsibilities throughout the organisation (operational risk-related)
- defined and documented organisational structure
- user/client involvement
- organisational adaptation/culture/structure
- data availability, migration, consolidation and cleaning
- data model
- minimal customisation to the software
- interfaces with legacy systems and other applications

- flexible and configurable architectural framework
- internal audit control throughout implementation

The literature review identified a total of 60 CSFs. A consolidation exercise reduced the 60 identified CSFs down to 29 through categorisation and a grouping of factors with associated sub-factors under the following 14 categories:

- strategy
- pre-project planning
- scope
- project resources
- project management
- performance monitoring
- decision-makers' support from senior management
- governance
- change management
- communication
- data
- application
- architecture
- internal audit

The second phase of the research made use of a questionnaire to validate the 29 identified CSFs within the context of the South African financial services industry.

Respondents to the questionnaire were asked to rate each CSF from "Neither critical nor important" to "Extremely critical and important". The study found that all of the CSFs identified through the literature review, with the exception of two, were considered critical and important to an ORMS implementation by the respondents.

Having examined the respondents' opinions to the individual CSFs, the survey proceeded to determine the respondents' prioritisation of the 14 identified CSF categories. Once determined, the respondents were asked to prioritise the CSFs within a particular category. The results are discussed in detail in the following section.

5.3 FINDINGS AND CONCLUSIONS

The cumulative results from the questionnaire enabled the CSFs and their respective categories to be ranked in order of importance and criticality. The main conclusions are grouped in order of priority according to the 14 identified CSF categories discussed in Chapter two.

It was observed that, in general, the highest prioritised CSF categories and CSFs tended to be those that influenced or impacted at an organisational level. Furthermore, it was observed that the lower prioritised categories and CSFs were found to impact and influence the project environment. As an example, strategy, decision-makers' support from senior management as well as governance, tend to influence and be managed at an organisational level and were prioritised as the top three CSF categories. Architecture, pre-project planning and performance monitoring, are all project-specific, and were prioritised as the lowest CSF categories. The analysis seemed to indicate that, for an implementation to have the highest probability of success, CSFs that affect the organisational level must first be examined and in place before concentrating on more operational and project-level CSFs.

The prioritised critical success factor categories and associated CSFs as documented in Table 4.41 above are now discussed individually in more detail below.

Strategy

- Having well-defined and documented operational risk management policies, processes and procedures was identified as the most important critical success factor to enable a successful ORMS implementation. This is possibly because the existence of these documents is usually considered as a starting point in the implementation process. Documented policies, processes and procedures enable the team involved to clarify with management how the new system will complement the existing way of handling operational risk, and where it will deviate. By identifying specifications and variances upfront, the team is able to adequately scope and plan for the implementation and ultimately increase the probability of a successful implementation. In the analysis of respondent types, this CSF was also identified as more critical and important for retail banks and wholesale banks than for private banks and consulting firms. This finding is in line with the observation above as in general retail and wholesale banks tend to have a greater exposure to operational risk due to the nature of their business.
- A common understanding of the risk strategy between the business and the IT department will ensure that the solution that is developed will meet the business' needs. It is also important that a mutual understanding of the risk strategy be maintained throughout the implementation in order to ensure alignment of the ORMS to the overall risk strategy.

- A defined risk appetite and tolerance will allow for the ORMS to be correctly calibrated. The risk appetite and tolerance will define the operational risk that the bank is prepared to tolerate and will thus have a direct impact on how the system that manages and monitors the operational risk is implemented and calibrated.

Decision-makers' support from senior management

- Having a project sponsor/champion from top management is vital to provide the right level of support behind the project. Typically, sponsorship of an ORMS implementation from a business perspective will fall under the risk and/or finance department. As such, the CRO/CFO should provide full support to drive the required change. Active support from top management throughout the implementation life cycle will ensure that decisions are made in a timely manner and that the implementation team receive the required support. All decision-makers involved in the project should be adequately empowered in order to affect the change at the level where it is required.

Governance

- A documented and agreed project team structure along with clearly defined roles and responsibilities throughout the organisation for all stakeholders involved with the ORMS implementation is crucial to ensure that all parties involved are aware of their role within the implementation. Establishing a project steering committee prior to the commencement of the project allows for a single project governance body to be established with the role of guiding, reviewing and approving all critical milestones and issues that arise on the project. The project steering committee should consist of senior managers and executives who have a direct stake in the ORMS implementation.
- A defined and documented organisational structure allows the project team to assess possible areas within the organisation that will be impacted by the implementation. Once an understanding has been established, the project team can adequately prepare and manage the stakeholders within these areas. It was noted in the analysis of the results that banks that have implemented an ORMS found it more critical and important to define and document the organisational structure for the ORMS implementation than compared to banks that did not have an ORMS or who did not plan to implement an ORMS.

Data

- The data required to set up and run the ORMS should be available prior to starting the implementation. Once the data has been identified, the data needs to be consolidated, verified and migrated into the new ORMS.

- A data model, which defines the relationships between disparate data entities within the operational risk environment, should be developed prior to implementation. Having a defined data model will allow for easy integration between the data source systems and the new ORMS. When examining the respondent types, it was noted that a documented data model was considered more critical and important by organisations that were planning on implementing an ORMS than those that did not have an ORMS or were not planning to implement an ORMS. This finding is in line with the view of having a defined data model prior to implementation.

Communication

- Project communication must be addressed by targeting the correct stakeholders and effective by delivering the correct message at the right time and in the right format. Throughout the project, the expectations of key stakeholders involved in the implementation must be managed through effective communication. This typically takes the form of frequent project progress communications to all identified stakeholders and is usually adapted to the style, structure and culture of the organisation.

Change management

- Any new system implementation brings a fair degree of change to an organisation. Effective change management is important to ensure that all affected parties understand the impact of the change and the way it affects their work. By establishing adequate training prior to the implementation, the organisation can begin to manage the change that a new ORMS will bring by adequately training and familiarising the end-users with the new features and functions of the ORMS. Examination of the respondent types revealed that effective change management was found to be more critical and important for retail banks than for private banks. This finding could be due to the general larger size of retail banks and the number of users who would be affected by a new system compared to smaller private banks.

Project resources

- The implementation team should consist of experienced and adequately skilled team members who have a balance of both business and technical knowledge. This is important when implementing an IT system that will be operated and run by the business. Skilled team members with both business and technical knowledge will be better positioned during the implementation to deploy a solution that meets the needs of the business while still being technically sound.
- Adequate project budget should be set aside to incentivise and link the project teams' compensation to the outcome of the project. Providing the project team with a financial

incentive that enables them to take a more personal interest in the successful outcome of the implementation.

- The project team should consist of full-time team members with a cross-functional mix of consultants as well as internal staff. The implementation of an ORMS will require a dedicated and focused team. Ensuring that the team is full time on an ORMS implementation will enable the team to focus on the implementation and not on business as usual activities. Ensuring a mix of cross-functional consultants provides the implementation with the necessary range of skills it may need, while having an internal team provides the perspective and insight into how the organisation operates. Examination of the respondent types identified that the CRO and the IT project manager found that having the right mix of external consultants and internal staff was less important and critical compared to the other positions.

Scope

- The scope of the ORMS implementation should be clearly established prior to the project commencing. The scope should include a fixed statement of requirements and should be organised within a project plan with frequent project milestones. The examination of the respondents revealed that a clearly established project scope was found to be more critical and important for retail banks than for private banks. This observation could be due to the average size of a retail bank in comparison with a private bank with the assumption that the larger organisation would have a more complex implementation.
- The scope of the implementation should be enterprise-wide. With operational risk affecting the entire organisation and not just a department or subsidiary, an implementation should be targeted across the enterprise. This would also create efficiencies and synergies across the organisation by means of common and standardised ways of handling and managing operational risk. The analysis of respondents revealed that banks that did not have current plans to implement an ORMS agreed that it was less important and critical to implement an ORMS enterprise-wide, than for banks that planned to implement or had implemented an ORMS. The observation supports the previous statement that banks that had completed or were planning an implementation recognised the importance of implementing enterprise-wide.

Project management

- Responsibility for managing the project should be assigned and made clear to all involved stakeholders before commencing with the project. Typically, a project manager will be assigned responsibility for delivery of a project. Communication to all stakeholders once responsibility has been assigned, will promote accountability for the delivery of the implementation as well as clarity.

- A competent project manager should be selected to lead the project. The project manager is one of the most critical team members throughout the implementation. Typically, the project manager is responsible for and should drive communication throughout the project as well as ensure that the correct team members are working on the correct tasks. The project manager is also responsible for delivering the project on time, on budget and against the defined scope.

Application

- The application should be tested prior to implementation. Application testing should focus on the stability and usability of the ORMS application as well as attempt to uncover any performance issues. Having a properly tested system prior to implementation will support the adoption of the system by end-users and will play a key role in determining the success of the overall implementation.
- The vendor implementing the ORMS should have experience in implementing within a financial services environment and should provide support throughout the implementation life cycle.
- If required, the selected ORMS should be interfaced with the organisation's legacy systems in order to ensure that the data required to support the ORMS is available and in the required format. This requirement is typical of organisations with a fragmented application architecture in which several applications contain data needed by the ORMS.

Architecture

- A flexible and configurable IT architectural framework should be developed to support the ORMS implementation. With a flexible and configurable IT architecture, the complexity and cost of an ORMS implementation should be reduced by capitalising on unified architectures, scalable solutions and automated services. This should have a positive impact on the probability of having a successful ORMS implementation. Analysis of the respondent types revealed that the architectural design of the ORMS solution was less critical and important to respondents with less than one year of experience as well as more than five years of experience compared to those who had between one and five years of experience.

Pre-project planning

- Clear realistic goals and objectives should be set prior to the project commencing. By establishing the objectives of the project upfront, the expectations of all stakeholders involved can be managed throughout the project life cycle. A set of clear goals and objectives can also be used to drive out more detailed project planning as well as establish a reference point against which project progress can be assessed.

- Business units impacted by the implementation as well as the IT department should be involved early in the pre-project planning phase. This will ensure that all stakeholders are afforded the opportunity to understand the impact that the ORMS will have on their department as well as on their role throughout the implementation.
- A clear implementation strategy should be developed and laid out prior to project start. The implementation strategy should provide more in-depth insight into how the ORMS will be implemented and by whom. The strategy should also focus on defining known risks and issues as well as mitigation strategies to address these prior to the project start.

Performance monitoring

- Effective monitoring and control of the project is necessary throughout the implementation life cycle with a strong and detailed plan being kept up to date. Project risks should be identified, assessed and managed frequently as part of the monitoring and control life cycle.
- Project success metrics should be defined up front in order to measure, as part of the monitoring and control life cycle, whether the project is delivering the intended benefits.

In the process of conducting the literature review and research, several areas for future improvement were identified. Possible limitations to the existing research as well as areas for future research are identified and discussed further in the section below.

5.4 LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

The following limitations to the current research are noted along with research recommendations to further define critical success factors necessary for the successful implementation of an operational risk management system.

5.4.1 Limitations of the current research

The limitations of this research should be borne in mind when interpreting the findings. These limitations, however, provide some opportunities or areas of improvement to be considered for future research. The limitations of this study can be divided into two areas:

- the first set of limitations concern potential bias in sample population and sample size; and
- secondly, the research design and methodology could be reconsidered.

5.4.2 Sample population and sample size

The sample population used in this study may not represent the perception of all stakeholders involved in an ORMS implementation within the South African financial services industry.

As the respondents were not required to identify either themselves or the financial institutions for which they worked, it was not certain whether the responses covered all the financial institutions identified or whether the returned questionnaires were from a particular set of financial institutions.

Another limitation is related to the sample size. Although the sample size in this study was considered adequate, with 52 questionnaires being completed (68 per cent response rate), a larger sample will increase confidence in the results.

With two possible limitations to the current research for consideration, several recommendations around areas for possible further research can be made:

- Do the CSFs identified in this study extend across industry and not just to the financial services industry and which of the identified CSFs are most transferable?
- How does the firm size and extent of the implementation (implemented only at group level or across all subsidiaries) affect the identified CSFs?
- Do firms experience any significant and unexpected problems as a result of an ORMS implementation? If so, what are those problems? Could they be classified under one or more of the ORMS CSFs identified in this study?
- At which stage of the ORMS implementation life cycle does each of the identified CSFs have the highest impact on the overall success of the implementation?

In conclusion, despite the current limitations of the research, the study has identified a set of 27 critical success factors that are relevant to ORMS implementation within the South African financial services environment. The prioritisation of the success factors along with their corresponding categories should provide future stakeholders with the ability to dramatically improve the probability of implementing an ORMS successfully. This success should be realised through the ability to focus scarce project and firm resources on the key factors most likely to influence the success of the implementation. The ability to actively foresee and manage other key factors throughout the project life cycle should also create efficiencies in both the management of the project as well as its delivery.

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APPENDIX 1 - IT Failure Rates

The following surveys as cited in IT Cortex (2001) provide statistical data over the rate of failure of IT projects.

The Robbins-Gioia Survey (2001)

Robbins-Gioia, LLC, a provider of management consulting services located in Alexandria, Virginia, made a study over the perception by enterprises of their implementation of an enterprise resource planning (ERP) package.

Survey scope

- 232 survey respondents spanning multiple industries including government, information technology, communications, financial, utilities, and health care.
- A total of 36 per cent of the banks surveyed had, or were in the process of, implementing an ERP system.

Key findings

- 51 per cent viewed their ERP implementation as unsuccessful;
- 46 per cent of the participants noted that, while their organisation had an ERP system in place, or was implementing a system, they did not feel their organisation understood how to use the system to improve the way they conduct business; and
- 56 per cent of survey respondents noted their organisation has a programme management office (PMO) in place, and of these respondents, only 36 per cent felt their ERP implementation was unsuccessful.

Comments on the Robins-Gioia Survey

Project failure is not defined by objective criteria but by the perception of the respondents. The advantage of a perception is that it naturally integrates multiple aspects. Its obvious disadvantage is that it is inevitably partial: if the respondent has taken an active role in the project it will inevitably embellish the reality, whereas if the project has been forced he/she might cast a grimmer look at the project outcome.

The Conference Board Survey (2001)

Survey scope

This survey interviewed executives at 117 banks that attempted ERP implementations

Key findings

- 34 per cent were very “satisfied”
- 58 per cent were “somewhat satisfied”
- 8 per cent were unhappy with what they got
- 40 per cent of the projects failed to achieve their business case within one year of going live
- the banks that did achieve benefits said that achievement took six months longer than expected
- implementation costs were found to average 25 per cent over budget
- support costs were underestimated for the year following implementation by an average of 20 per cent

The KPMG Canada Survey (1997)

In April 1997, KPMG Canada sent a survey questionnaire focusing on IT project management issues to Canada's leading 1 450 public and private sector organisations. The main purpose was to outline the reasons behind the failure of information technology projects.

Survey scope

Out of 1 450 questionnaires sent, 176 were analysed. Of these, 61 per cent reported details on a failed IT project.

Key findings

Over 61 per cent of the projects that were analysed were deemed by the respondents to have failed. More than three quarters blew their schedules by 30 per cent or more; more than half exceeded their budgets by a substantial margin. Considering that an estimated $25 billion is spent on IT application development in Canada annually, the survey data clearly indicated that unbudgeted IT project expenditures must run into the billions of dollars.

The Chaos Report (1995)

The Chaos Report is the first survey made by the Standish Group. This report is the landmark study of IT project failure. It is cited by everybody writing an article or making a presentation where a reference is made of IT project failure.

Scope of the study

The respondents to the Standish Group survey were IT executive managers. The sample includes large, medium, and small banks across major industry segments: banking, securities, manufacturing, retail, wholesale, heath care, insurance, services, and local, state, and federal organisations. The total sample size was 365 respondents representing 8 380 applications. In addition, the Standish Group conducted focus groups and personal interviews to provide qualitative context for the survey results.

Key findings

The Standish Group research showed a staggering 31.1 per cent of projects will be cancelled before they ever get completed. Further results indicate 52.7 per cent of projects will cost over 189 per cent of their original estimates. The cost of these failures and overruns are just the tip of the proverbial iceberg. The lost opportunity costs are not measurable, but could easily be in the trillions of dollars in the United States alone.

Based on this research, the Standish Group estimated that in 1995, American banks and government agencies would spend $81 billion for cancelled software projects. These same organisations would pay an additional $59 billion for software projects that would be completed, but would exceed their original time estimates. The Standish Group estimated that almost 80 000 projects were cancelled in 1995.

On the success side, the average is only 16.2 per cent for software projects that are completed on time and on budget. In the larger banks, the news is even worse: only 9 per cent of their projects come in on time and on budget. Moreover, even when these projects are completed, many are no more than a mere shadow of their original specification requirements. Projects completed by the largest American banks have only approximately 42 per cent of the originally proposed features and functions. Smaller banks do much better. A total of 78.4 per cent of their software projects will get deployed with at least 74.2 per cent of their original features and functions.

The OASIG Study (1995)

This study has been undertaken under the auspices of OASIG, a special interest group in the UK concerned with the organisational aspects of information technology.

Scope of the study

Information was collected in 1995 in the United Kingdom from a sample of 45 experts employed primarily by universities or consultancies. On average, each have over 20 years' personal experience representing a cumulative knowledge base of over 900 years. The researchers drew their opinion from a sample of approximately 14 000 user organisations. Of these interviewees, 31 (69 per cent) included consultancy work as a major component of their work, and 27 (60 per cent) included research; many do both. Their professional areas of expertise covered the domains of management, business and social science. A small number of those interviewed had a background in engineering.

Data was collected by interviewing researchers and consultants using a semi-structured interview schedule. Some preparation was required by them. Each interview lasted, on average, around 1.5 to 2 hours, though some lasted considerably longer.

Key findings

The IT project's success rate quoted revolves around 20–30 per cent based on its most optimistic interviews. Bottom line, at best, 7 out of 10 IT projects "fail" in some respect.

APPENDIX 2 – Survey Invitation

Dear Respondent

You are invited to participate in an academic research study in the area of commerce, at the University of South Africa. The purpose of the study is to investigate operational risk management system implementation critical success factors.

I value your participation and will appreciate it if you can complete this questionnaire. It should not take more than 15 minutes of your time and all information will be treated as strictly confidential.

Research title: Critical success factors for the implementation of an operational risk management system for South African financial services organisations

Researcher: Michael Gibson, MCOM student, UNISA

46009639@mylife.unisa.ac.za

Regards

Michael Gibson

Study background

1) Purpose of the research:

Operational risk has become a “Hot Topic” in banking circles in recent years and to meet the demands from banks, software vendors have developed sophisticated operational risk management systems (ORMS). As with all IT implementations however, up to 70 per cent of IT projects “fail”.[8] With such high failure rates across implementations, some mechanism is needed to mitigate the risk of failure and ensure the success of the IT investment in an ORMS. Having a set of well-defined Critical Success Factors (CSF) is one such solution. A thorough understanding of the ORMS CSF’s prior to project mobilisation would considerably increase the chance of a successful implementation.

The purpose of this Questionnaire is to identify the critical success factors necessary to implement an ORMS successfully within a South African financial services organisation. The Questionnaire will seek to confirm or reject a base set of CSF’s identified through a comprehensive literature review.

2) Scope of the study:

The study will focus on the South African financial service environment but will be of use to any organisation who wishes to implement an ORMS.

3) The Research shall be conducted in the following manner:

- A research survey experiment consisting of approximately 43 questions will be administered through an online survey tool (www.surveymonkey.com)
- The duration of the participant’s participation in the research survey is approximately 15 minutes
- The identity of all participants will remain confidential throughout the research project and data collected in this research project will remain confidential
- Findings will be reported in the study in summary form only
- There is no cost associated with participation in the survey experiment
- The results of the survey will be distributed to the participants once the research is completed (provided an email address is supplied)

The Survey can be taken via the following link and all feedback shall be completely anonyms.

Survey Link:

https://www.surveymonkey.com/s/ORMS_CSF_Questionnaire

[8] IT Project failure will broadly be defined as failing to meet Original Scope, Expectations, Budget and Timeline

APPENDIX 3 – Survey Questionnaire

Introduction:

Operational risk has become a “Hot Topic” in banking circles in recent years and to meet the demands from banks, software vendors have developed sophisticated operational risk management systems (ORMS). As with all IT implementations however, up to 70 per cent of IT projects “fail”[9] and with such high failure rates across implementations, some mechanism is needed to mitigate the risk of failure and ensure the success of the IT investment in an ORMS. Having a set of well-defined Critical Success Factors (CSF) is one such solution. A thorough understanding of the CSF’s related to an ORMS implementation prior to project mobilisation would considerably increase the chance of a successful implementation.

The purpose of this Questionnaire is to identify the critical success factors necessary to implement an ORMS successfully within a South African financial services organisation. The Questionnaire will seek to confirm or reject a base set of CSF’s identified through a comprehensive literature review.

The Questionnaire is divided into the following segments:

1) General information about the respondent and their organisation

2) Questionnaire on CSF’s for implementing an ORMS

Notes and Instructions to the Questionnaire:

1) All questions relate to critical success factors (CSF) necessary for the successful implementation of an operational risk management system (ORMS)

2) The following scale will be used to indicate your opinion on the importance and criticality of each identified CSF on the success of an ORMS implementation:

[9] IT Project failure will broadly be defined as failing to meet Original Scope, Expectations, Budget and Timeline

Scale Value	Scale Description
1	**Neither critical nor important.** Indicates that the statement is neither critical nor important for an ORMS implementation according to the respondents view and experience.
2	**Important but not critical.** Indicates that the statement is important but not critical for an ORMS implementation according to the respondents view and experience.
3	**Somewhat critical and important.** Indicates that the statement is somewhat critical and important for an ORMS implementation according to the respondents view and experience.
4	**Critical and important.** Indicates that the statement is critical for an ORMS implementation according to the respondents view and experience.
5	**Extremely critical and important.** Indicates that the statement is very critical and important for an ORMS implementation according to the respondents view and experience.

For the purposes of this questionnaire, critical shall be defined as being urgently needed, while important shall be defined as being of much or great significance or consequence.

3) The CSF's have been categorised according to the following categories as they relate to an implementation of an operational risk management system:

Category Name	Category Description
Strategy	All CSF's related to the support of the strategic direction of the system implementation project.
Pre project planning	All CSF's related to the pre project planning phase of a system implementation project.
Scope	All CSF's that relate to the scope of a system implementation project. The PMI defines Scope as, the work that must be performed to deliver a product, service, or result with the specified features and functions (PMI 2008:444).
Project resources	All CSF's that relate to the project resources who are involved with a system implementation project.
Project management	All CSF's that are related to the project management of the system implementation project. The PMI defines The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (PMI 2008:6).
Performance monitoring	All CSF's that are related to the performance monitoring of a system implementation project. The PMI defines Performance Monitoring as those processes required to track, review, and regulate the progress and performance of the project, identify any areas in which changes to the plan are required, and initiate the corresponding changes (PMI 2008:39).
Decision-maker(s) support from senior Management	All CSF that are related to the key stakeholders and decision-makers involved with a system implementation project.

Category Name	Category Description
Governance	All CSF's related to the governance of a system implementation project.
Change management	All CSF's that are involved with the change management effort throughout the organisation who is undergoing a system implementation project.
Communication	All CSF's related to both the internal and external communication between all stakeholders involved in the system implementation project.
Data	All CSF's related to the application data required for a system implementation project.
Application	All CSF's related to the application being implemented as part of the system implementation project.
Architecture	All CSF's related to the solution architecture for the system being implemented
Internal audit	All CSF's related to Internal Audits role within a system implementation project.

1) General Information

Please select the appropriate answer by ticking the corresponding box:

Business Type	[ ] Retail bank [ ] Wholesale bank [ ] Private bank [ ] Consulting firm
Which of the following statements around implementing an ORMS best fits your organization?	[ ] We have implemented an ORMS [ ] We plan to Implement an ORMS [ ] We have no current plans to implement an ORMS
Title / position	[ ] Chief Finance Officer (CFO) [ ] Chief Risk Officer (CRO) [ ] Finance Manager [ ] Risk Manager [ ] Internal Consultant [ ] External Consultant [ ] Project/Team leader [ ] IT project leader [ ] Other ……
Years of experience in operational risk management system implementation	[ ] No experience [ ] Less than 1 year [ ] Between 1 and 3 years [ ] Between 3 and 5 years [ ] More than 5 years

Questionnaire:

Please evaluate each of the following factors in terms of its importance and criticality in influencing success in implementing an operational risk management (ORMS) system.

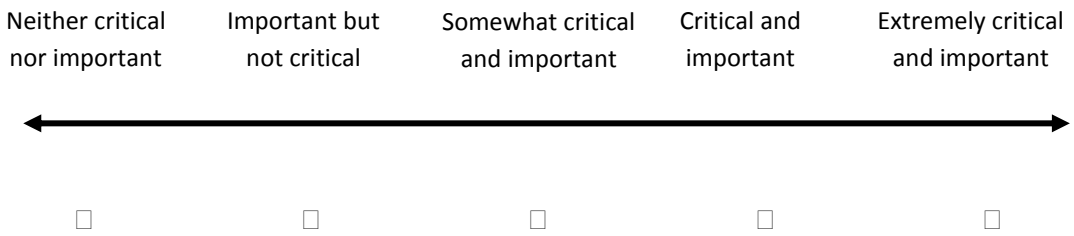
1) Please prioritise the critical success factor categories by selecting the top 5 categories according to their influence on the overall success of an ORMS.

ORMS CSF Category	Priority
1. Strategy	
2. Pre Project Planning	
3. Scope	
4. Project Resources	
5. Project Management	
6. Performance Monitoring	
7. Decision-maker(s) Support from Senior Management	
8. Governance	
9. Change Management	
10. Communication	
11. Data	
12. Application	
13. Architecture	
14. Internal Audit	

2) Strategy

CSF's related to the support of the strategic direction by the system implementation project.

2.1) How important and critical is it to have a common understanding between business and IT of the risk strategy?



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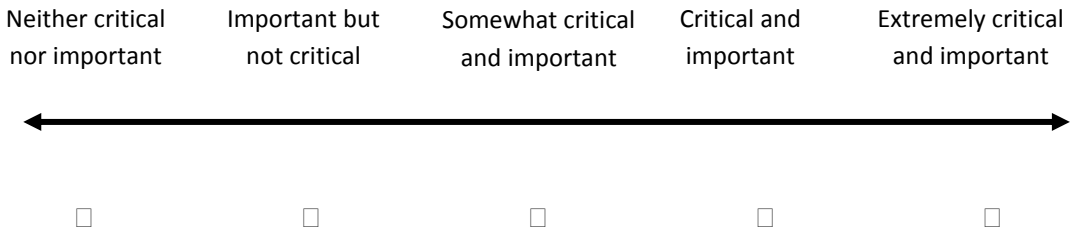
2.2) How important and critical is it to have a defined risk appetite?



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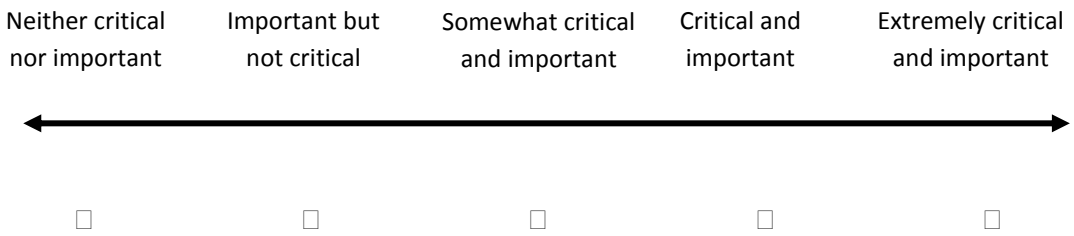
2.3) How important and critical is it to have well defined and documented operational risk management policies, processes and procedures?



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2.4) Please prioritise the factors by allocating a total of 100 points across the factors (The sum of all points allocated must equal 100)

Factor	Priority
1.1. Common understanding between business and IT of risk strategy	
1.2. A defined risk appetite and tolerance	
1.3. Well defined and documented operational risk management policies, processes and procedures	

3) Pre Project Planning

CSF's related to the pre project planning phase of a system implementation project.

3.1) How important and critical is it to have clear, realistic goals and objectives (around the ORMS and what the implementation will achieve)?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
☐	☐	☐	☐	☐

3.2) How important and critical is it to have a clear implementation strategy?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
☐	☐	☐	☐	☐

3.3) How important and critical is it to have Business Unit and IT involvement in pre-project planning (Business Unit involvement in early planning phases)?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
☐	☐	☐	☐	☐

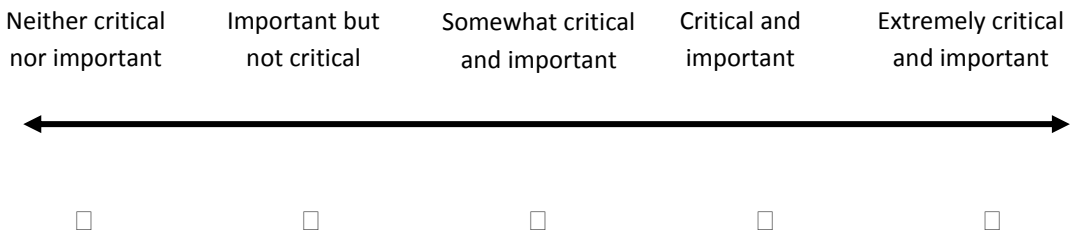
3.4) Please prioritise the factors by allocating a total of 100 points across the factors (The sum of all points allocated must equal 100)

Factor	Priority
2.1. Clear realistic goals and objectives	
2.2. A clear implementation strategy	
2.3. Business Unit and IT involvement in pre-project planning	

4) Scope

CSF's that relate the scope of a system implementation project. Scope is defined as, the work that must be performed to deliver a product, service, or result with the specified features and functions.

4.1) How important and critical is it to have a clearly established project scope (clear and fixed statement of requirements along with smaller project milestones)?



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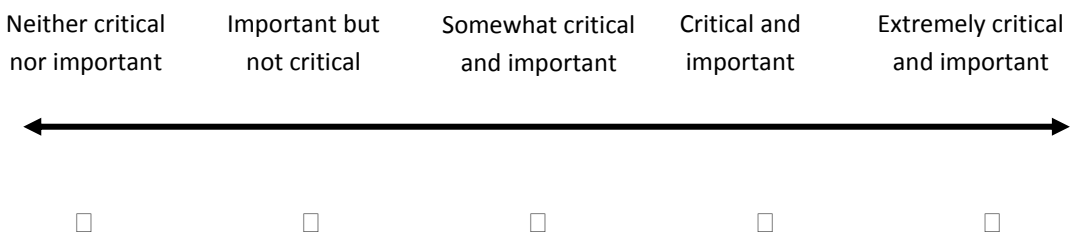
4.2) How important and critical is it to ensure that the ORMS implementation is enterprise wide?



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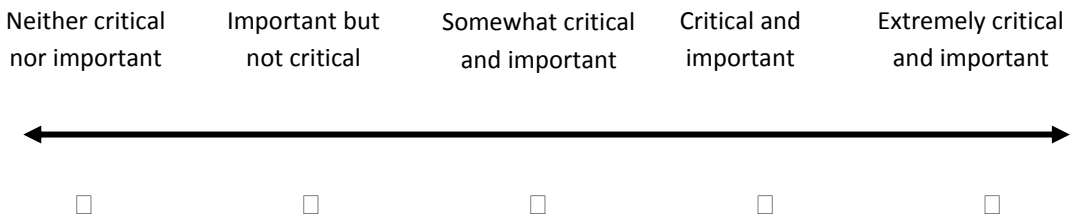
4.3) Please prioritise the factors by allocating a total of 100 points across the factors (The sum of all points allocated must equal 100)

Factor	Priority
3.1. Clearly establish project scope	
3.2. ORMS implementation is enterprise wide	

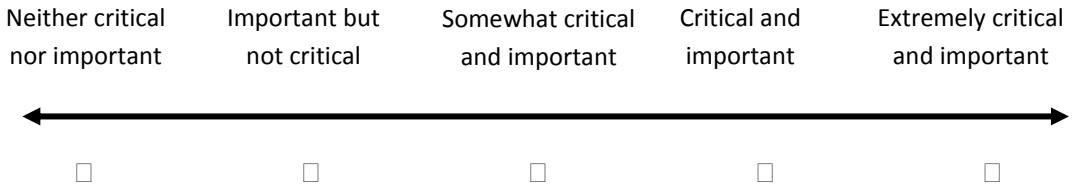
5) Project Resources

CSF's that relate to the project resources that are involved with a system implementation project

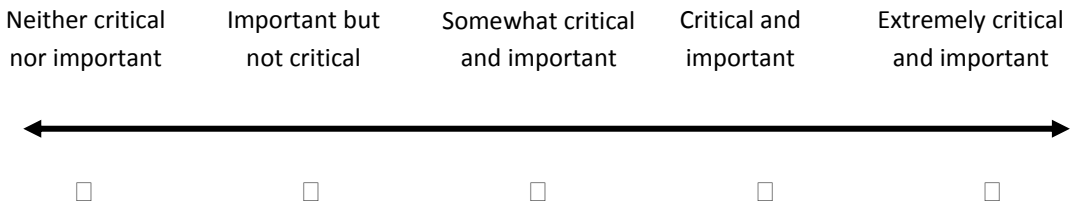
5.1) How important and critical is it to ensure adequate budget for project resources (to cover in addition to the direct project costs, costs associated to project team performance incentives, e.g. project bonuses)?



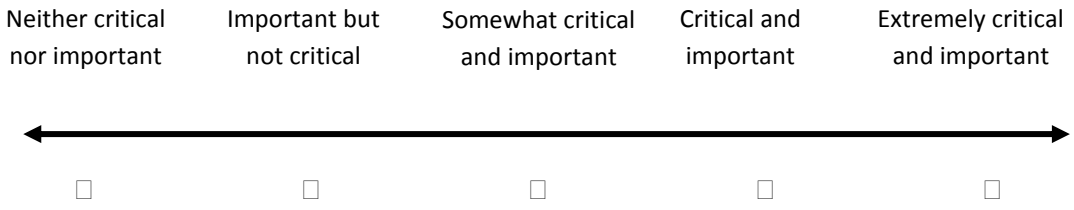
5.2) How important and critical is it to have a cross functional team consisting of the right mix of external consultants and internal staff?



5.3) How important and critical is it to have full-time (dedicating 100 per cent of their time to the project) team members (assuming that they are adequately skilled)?



5.4) How important and critical is it to have an experienced project team with the right mix of business and technical skills?



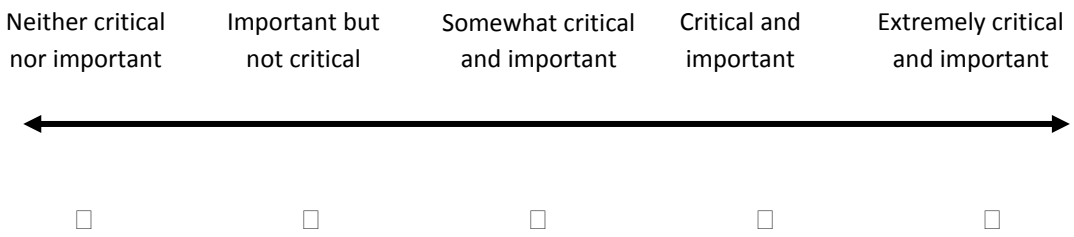
5.5) Please prioritise the factors by allocating a total of 100 points across the factors (The sum of all points allocated must equal 100)

Factor	Priority
4.1 Adequate budget for project resources	
4.2 Cross functional team consisting of a mix of external consultants and internal staff	
4.3 Full-time team members	
4.4 Experienced and adequately skilled project team	

6) Project Management

CSF's that are related to the project management of the system implementation project. Project management is defined as the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

6.1) How important and critical is it to assign responsibility (to one or several individuals for delivery of the project)?



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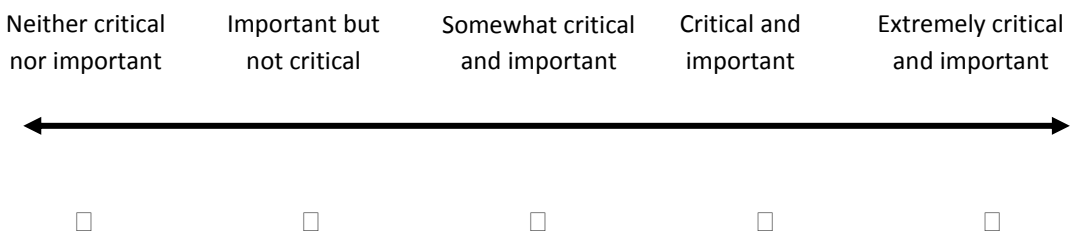
6.2) How important and critical is it to have a competent project manager (both in terms of skill and leadership ability)?



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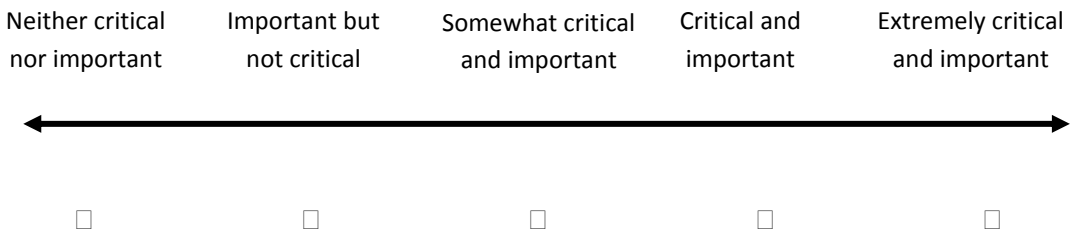
6.3) Please prioritise the factors by allocating a total of 100 points across the factors (The sum of all points allocated must equal 100)

Factor	Priority
5.1 Assign responsibility	
5.2 Competent project manager	

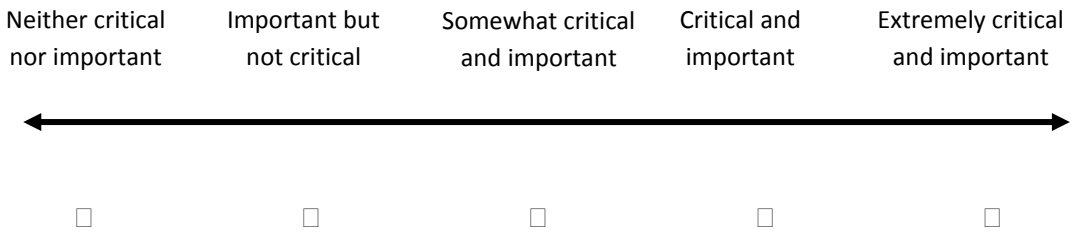
7) Performance Monitoring

CSF's that are related to the performance monitoring of a system implementation project. Performance Monitoring is defined as those processes required to track, review, and regulate the progress and performance of the project, identify any areas in which changes to the plan are required, and initiate the corresponding changes.

7.1) How important and critical is it to have effective monitoring/control throughout the implementation lifecycle (strong/detailed plan kept up to date throughout the implementation lifecycle along with ensuring that risks are addressed/assessed/managed)?



7.2) How important and critical is it to have specified measures of project success (predefined metrics to track and monitor the project's success against, e.g. 40 per cent decrease in a particular process time)?



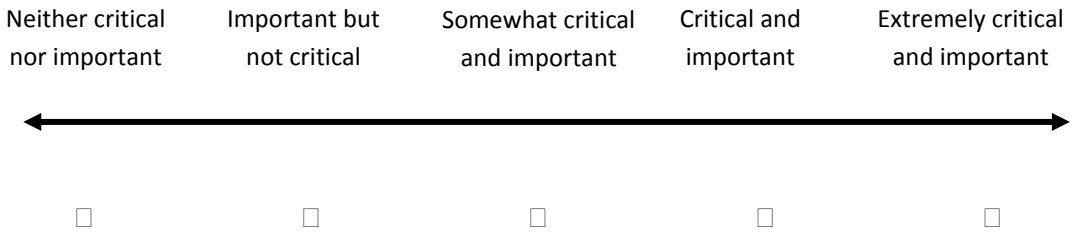
7.3) Please prioritise the factors by allocating a total of 100 points across the factors (The sum of all points allocated must equal 100)

Factor	Priority
6.1 Effective monitoring/control throughout the implementation lifecycle	
6.2 Specified measures of project success	

8) Decision-maker(s) Support from Senior Management

CSF's that are related to the key stakeholders and decision-makers involved with a system implementation project.

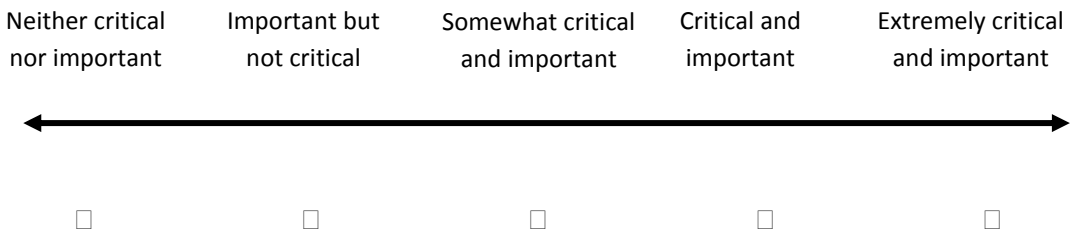
8.1) How important and critical is it to have a project Sponsor/Champion from top management (having the CRO, or equivalently empowered decision-maker, driving change along with active top management support throughout the implementation lifecycle)?



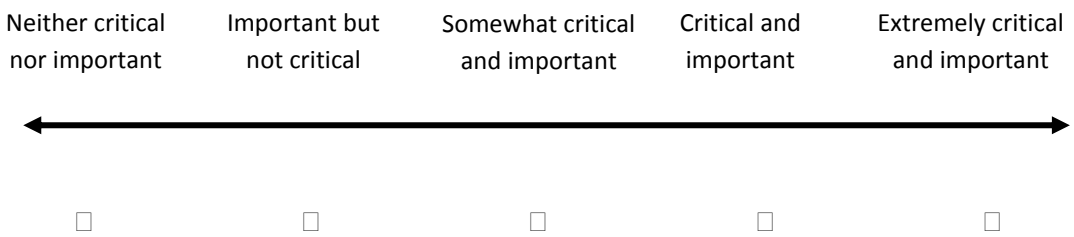
9) Governance

CSF's related to the governance of a system implementation project.

9.1) How important and critical is it to have a documented and agreed project team structure (reflecting clearly defined roles and responsibilities throughout the organisation as they relate to the project team along with a defined project steering committee)?



9.2) How important and critical is it to have a defined and documented organisational structure (an organisational wide structure documenting interdepartmental roles/reporting lines that reflecting the ORMS projects relationship/impact on this structure)?



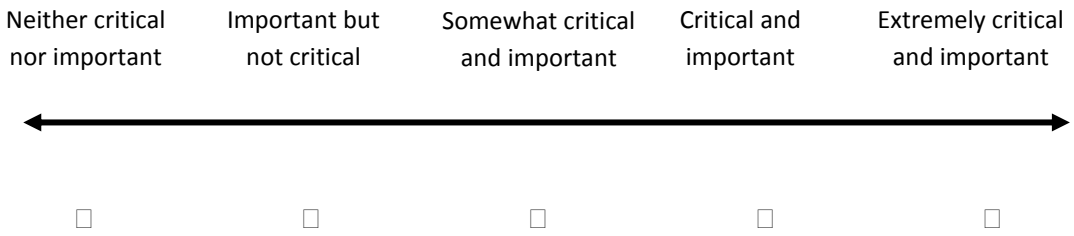
9.3) Please prioritise the factors by allocating a total of 100 points across the factors (The sum of all points allocated must equal 100)

Factor	Priority
8.1 A documented and agreed project team structure	
8.2 A defined and documented organisational structure	

10) Change Management

CSF's that are involved with the change management effort throughout the organisation undergoing a system implementation project.

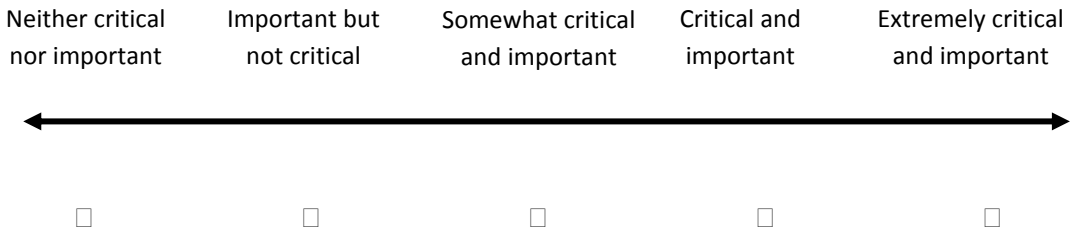
10.1) How important and critical is it to ensure effective Change Management (focusing on User/Client involvement throughout the implementation process along with adequate training)?



11) Communication

CSF's related to both the internal and external communication between all stakeholders involved in the system implementation project.

11.1) How important and critical is it to ensure targeted and effective communication (management of expectations at all levels along with communication among key stakeholders and continuous project progress communication)?



12. Data

CSF's related to the application data required for a system implementation project.

12.1) How important and critical is it to ensure that operational risk related data is available, in a single data repository?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
◻	◻	◻	◻	◻

12.2) How important and critical is it to have a documented Data model (Conceptual, logical and physical data model for all data related to an ORMS)?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
◻	◻	◻	◻	◻

12.3 Please prioritise the factors by allocating a total of 100 points across the factors (The sum of all points allocated must equal 100)

Factor	Priority
11.1 Ensure that operational risk related data is available, cleansed and migrated to a single data repository	
11.2 A documented Data model	

13. Application

CSF's related to the application being implemented as part of the system implementation project.

13.1) How important and critical is it to have minimal customisation to the ORMS software (aligning the business processes to the software?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
☐	☐	☐	☐	☐

13.2) How important and critical is it to ensure that the ORMS interfaces with legacy systems and other applications?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
☐	☐	☐	☐	☐

13.3) How important and critical is it to conduct system testing prior to implementation?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
☐	☐	☐	☐	☐

13.4) How important and critical is it to have a vendor with past experience in a similar implementation?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
☐	☐	☐	☐	☐

13.5) Please prioritise the factors by allocating a total of 100 points across the factors (The sum of all points allocated must equal 100)

Factor	Priority
12.1 Minimal customisation to the ORMS software	
12.2 Ensure that the ORMS interfaces with legacy systems and other applications	
12.3 Conduct system testing prior to implementation	
12.4 Vendor support and past experience	

14) Architecture

CSF's related to the solution architecture for the system being implemented

14.1) How important and critical is it to have flexible and configurable architectural framework (architectural design of the ORMS solution)?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
☐	☐	☐	☐	☐

15) Internal Audit

CSF's related to Internal Audits role within a system implementation project.

15.1) How important and critical is it to have Internal Audit control throughout implementation (the involvement of the Internal Audit department throughout the implementation lifecycle)?

Neither critical nor important	Important but not critical	Somewhat critical and important	Critical and important	Extremely critical and important
☐	☐	☐	☐	☐

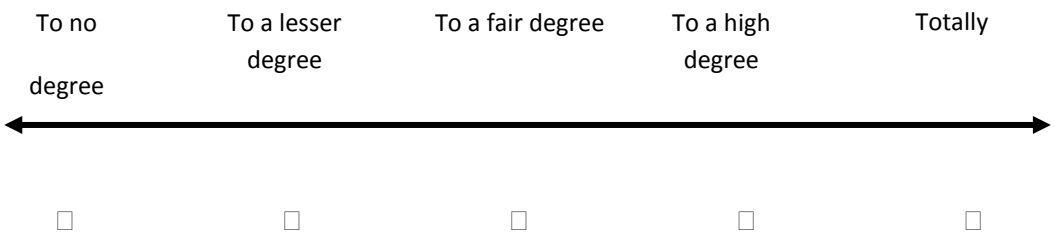
APPENDIX 4 – Diagnostic Questionnaire

As a respondent to the Questionnaire on the Critical Success Factors for implementing an operational risk management system, it would be appreciated if you could also answer the following diagnostic questions relating to the Questionnaire. Please select the option that is most appropriate.

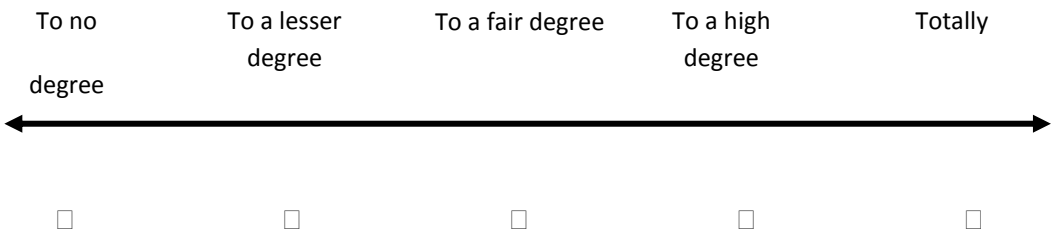
1. How long did it take to complete the full Questionnaire?

Answer	
1.1. 0 to 10 minutes	
1.2. 10 to 20 min	
1.3. 20 to 30 min	
1.4. More than 30 min	

2. To what degree did you understand the objectives and aim of the Questionnaire?



3. To what degree did you comprehend the questions?



4. If to no degree, please elaborate.

5. To what degree did you feel that the Questionnaire was comprehensive in its coverage of possible critical success factors?

To no degree	To a lesser degree	To a fair degree	To a high degree	Totally
☐	☐	☐	☐	☐

6. To what degree did you feel that the Questionnaire was structured in a logical manner?

To no degree	To a lesser degree	To a fair degree	To a high degree	Totally
☐	☐	☐	☐	☐

7. To what degree did you feel that the scale used was appropriate for the Questionnaire?

To no degree	To a lesser degree	To a fair degree	To a high degree	Totally
☐	☐	☐	☐	☐

8. Were the instructions to complete the Questionnaire simple and clear?

Answer	
8.1 Yes	
8.2 No	

9. If your answer is no, please elaborate.

10. Other observations or comments about the Questionnaire?

End - thank you very much for your participation!