The impact of Enterprise Risk Management on firm value: Evidence from Johannesburg Securities Exchange

by

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DECLARATION

I declare that this study, **The Impact of Enterprise Risk Management on Firm Value: Evidence from Johannesburg Securities Exchange**, is my original work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references. I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution. This dissertation does not incorporate, without acknowledgement, any material previously submitted for a degree at any other university.

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DEDICATION

This work is dedicated firstly, to my Lord and Saviour, Jesus Christ, who is my creator, the author and finisher of my life. Secondly, I dedicate this work to my loving wife, Nokuthemba, who supported and inspired me, through her wisdom, understanding, and patience to achieve this academic milestone.

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ABSTRACT

Enterprise risk management (ERM) has emerged as a distinct model for managing a sophisticated portfolio of corporate risks. The purpose of this study was to determine the impact of ERM on firm value for companies on the Johannesburg Securities Exchange. The sample comprised forty-five firms from different industries over the period 2000-2016. Most studies used five or ten-year periods, using data derived from only one industry. Tobin's Q was used as a proxy for firm value. Multivariate regression analysis was employed to determine statistical relationships. The findings indicate a significant correlation between ERM and Tobin's Q, indicating that ERM significantly contributes to firm value. These findings may be used to develop and shape ERM policy frameworks for firms and countries. The study provides new insights, from an African emerging market context on the value effects of ERM. Larger and international samples may improve future studies.

Key terms: Enterprise risk management, JSE, Tobin's Q, Firm value, Firm performance, Generalised method of moments, Maximum-likelihood treatment effects.

LIST OF ABBREVIATIONS / ACRONYMS

APT	arbitrage pricing theory
BCBS	Basel Committee on Banking Supervision
BIS	Bank of International Settlements
CAPM	capital asset pricing model
CEO	chief executive officer
CRO	chief risk officer
DIV	dividends
ERM	enterprise risk management
FE	fixed effects
FEM	fixed effects model
FS	financial slack
GLS	generalised least squares
GMM	generalised method of moments
IDIV	international diversification
JSE	Johannesburg Securities Exchange
LSDV	least squares dummy variable
MLE	maximum likelihood treatment effects
RE	random effects
REM	random effects model
ROA	return on assets
ROE	return on equity
SARB	South African Reserve Bank
SG	Sales growth
S&P	Standard & Poor's
TRM	traditional risk management
UK	United Kingdom
US	United States
USA	United States of America

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CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 Introduction

This introductory chapter comprises a background of the study, the problem statement, research objectives and hypotheses and the scope of the study. The discussion of the shortcomings and importance of the study are also be highlighted, and the structure of the study provided.

1.2 Background

The private sector is one of the key mechanisms for economic prosperity and advancement of nations for economic growth and it also helps to stabilise the economy (Pollin, Epstein, Heintz, & Ndikumana, 2009). The global business environment has been recently plagued by corporate scandals and problems with a potential to wipe out balance sheets and value of the firms concerned (Hull, 2012).

Various risk management blunders and failures have threatened the very existence of many firms globally (Bessis, 2015). Hull (2012) highlights a litany of corporate scandals that have plagued the profitability and sustainability of firms. For example, in 1988, a United Kingdom (UK) local authority, Hammersmith and Fulham, lost over six hundred million dollars due to inadequate derivatives knowledge by two of its traders. In 1994, Kidder Peabody, a US firm, lost over three hundred million dollars because of problems in the computer program that calculated profits. In the same year, the treasurer of Orange County, a US municipality, lost about two billion dollars due to losses from taking speculative derivatives positions on interest rates. The improper and reckless risk management culture exhibited by traders in these firms point to a cultural decay in value systems and slack controls in place in these companies.

Hull (2012) further reports that in 1995, Nick Leeson, a Barings Bank derivatives trader, stationed in Singapore, destroyed this 200-year-old bank, by speculating on the Nikkei 225 through futures and options. Leeson made about one billion dollars in losses. In the UK, in 1997, National Westminster Bank, lost over one hundred and thirty million dollars due to problems in a model designed to price derivatives. A total loss of four billion dollars was made by a US hedge fund, because of betting on derivatives.

Corelli (2015) indicated that in 2001, the Enron Corporation, was a symbol of bad corporate governance and accounting practices. Enron's key executives misrepresented the firm's financial position through creative accounting fraud and inflated figures in its balance sheet by using special purpose vehicles to hide its actual declining financial health. The company later filed for bankruptcy.

In 2002, a financial institution, Allied Bank, lost about seven hundred million dollars because of breaches in derivatives policies by one of its traders. Limited technical know-how exacerbated the downward spiral in these firms. In 2007, the US subprime mortgage problem rose to alarming proportions due to lax risk management controls by many banking institutions in the US who were responsible for packaging risky mortgage deals to clients who did not qualify for these mortgages. The defaults on these deals caused huge shocks in the financial markets globally, culminating in a global financial crisis (Hull, 2012).

Poor risk monitoring protocols damaged some global firms. Societe Generale, a French banking concern, in 2008, through its equity trader, Jerome Kerviel, lost over US$7 billion speculating on movements in equity indices in January 2008. Kerviel is alleged to have concealed his exposure by creating fictitious trades. In 2011, Kweku Adoboli, a Union Bank of Switzerland (UBS) derivatives trader, and part of its Delta One team lost US$2.3 billion taking unauthorised speculative trades for derivatives in share prices indices (Hull, 2012).

Reputational risk has recently gained substantial traction globally. According to McGee (2017) Volkswagen (VW), a German automobile concern, paid over four billion dollars to US authorities to settle its emissions cheating scandal. VW had to budget for about twenty billion dollars to cover potential future litigation costs from its global stakeholders. The risk for more litigations still remains from Europe and other economic groupings. The UK Financial Conduct Authority (FCA) during 2015, fined Barclays Bank about ninety million dollars for maintaining lax risk management controls regarding some of its risky customers (www.fca.org.uk). Reuters.com reported that HSBC Holdings Plc classified Mexico in its lowest risk class, which excluded US$670 billion from being audited and screened. HSBC resolved to pay about $1.92 billion to settle this penalty in the US in 2012.

Similarly, the MTN Group Limited, in 2016 settled to pay approximately US$1.7 billion in cash to the Nigerian government, about 33% of its original penalty, for flouting communications laws (Bloomberg.com). The South African Standard Bank Group was in December 2015, fined R530 million by US and UK regulators on fraud and corruption

involving Stanbic Tanzanian executives (www.moneyweb.co.za). In early 2014, the SARB fined SA's largest banks about one hundred and thirty million rands for flouting provisions of the Financial Intelligence Centre Act (FICA) (www.bdlive.co.za).

In the same light, according to Mittner (2016), African Bank was placed under curatorship in August 2014, for failing to manage its key corporate risks. The Myburgh Commission of Inquiry held that African Bank managed its financial and governance affairs without due care which resulted in its shares being suspended from trading at the JSE. African Bank has however been reinstated onto the bourse.

In a similar context, Gates, Nicholas & Walker (2012), examined the benefits of ERM with respect to performance and enhanced strategy implementation. The study reported that ERM maturity level, a conducive risk culture and effective flow of risk information are positively related to improved decisions in a firm. A well-designed risk management plan with adequate resources can enhance the firm's earnings potential. Betty and Simkins (2010) further add that it can be challenging to discern or quantify the value of ERM and distinguish it from the value contributed by internal control in general.

Studies on the nexus between ERM and firm value are also very limited (Hoyt and Liebenberg, 2008). Firms are grappling to understand how ERM enhances company value. ERM is a large investment which requires a substantial amount of human, financial and technical resources (Gatzert and Martin, 2015). It is therefore important to establish whether any relationship exists between ERM and firm value. Otherwise, companies may not need to adopt ERM if there is no link between this new initiative and firm value enhancement.

Academic literature has linked ERM implementation with better company performance (financial results) (COSO ERM, 2004; Gordon, Loeb & Tseng, 2009, McShane, Nair & Rustambekov, 2011). Other scholars investigated the correlation between integrated risk management and firm value. For instance, Pagach and Warr (2008), reported that larger companies, with high financial leverage and unstable cash flows have more propensity to implement a holistic approach to risk management.

The challenges of adopting ERM include high financial investment, confusion of what ERM is and what it is not; and the lack of understanding and buy in from senior management and the board (Bainbridge, 2009a, 2009b). Despite a plethora of research studies supporting that ERM is a useful and value adding corporate initiative, relatively few firms

have adopted ERM (Hoyt and Liebenberg, 2008). The Economist Intelligence Unit (2001) study reported that about forty percent of companies in North America, Europe and Asia had instituted ERM. Liebenberg and Hoyt (2003) reported approximately twenty-five firms that had implemented ERM over a five-year period from 1997 to 2001. Within the same light, Pagach and Warr (2011) indicated that about one-hundred-and-forty companies had implemented integrated risk management from 1999 to 2005.

It is clear from the above-mentioned events on the global business landscape that firms with poor risk management protocols and systems increase the probability of poor corporate governance and suboptimal financial processes (Segal, 2011), and thus damage their balance sheets, and reputations.

1.3 Problem Statement

ERM is being adopted by many firms globally. The value relevance of ERM is scarce (Pagach and Warr, 2010). Credit rating firms like Moody's, Standard & Poor's (S&P), and Fitch have begun using ERM as part of their ratings methodology. This development further pushes firms to pay serious attention to adopting an integrated approach to risk management. Investing in ERM is highly expensively and costly, therefore the usage of this model should be clearly beneficial (Fraser and Simkins, 2010).

The Beasley, Pagach and Warr (2008) study examined the empirical results on the benefits of a senior risk executive. This study investigated share price behaviour as a result of reporting the employment of an executive responsible for risk. The study hypothesised that the hiring of risk executives improves firm value and positively impacts the company's expansion objectives, leverage and assets opacity. The empirical evidence from this study highlighted that owners of firms with limited cash reserves, unstable earnings, and highly opaque assets are highly associated with ERM implementation. This empirical evidence gives an inconclusive view on the value effects of a holistic approach to risk management (Pagach and Warr, 2010). Pagach and Warr (2008) further adds that an integrated plan to risk management can improve the value of a firm if it reduces the probability of losses and bankruptcy.

Beasley, Pagach & Warr (2008) contend that many firms are unwilling to implement ERM because it is difficult to quantify the value of a holistic approach to managing a portfolio of risks. The advocates of portfolio theory argue that risk management is irrelevant and unnecessarily expensive, since idiosyncratic risks can be managed or reduced at a

cheaper price. Fraser and Simkins (2010) contend that ERM is beneficial, particularly for firms with certain characteristics, but may negatively impact value of other kinds of firms, depending on capital structure and other financial attributes.

Tahir and Razali (2011) reported that the trend towards ERM use is hampered by the relatively scarce empirical evidence on the value effects of holistic risk management. Although ERM is believed to have an impact on firm value there is limited evidence on its actual impact on firm value. Well-known studies from various parts of the world include Pagach and Warr (2010), Hoyt and Liebenberg (2011), Tahir and Razali (2011), Razali, Yazid and Tahir (2011), and Golshan and Rasid (2012). There are also a few empirical studies on the relationship between ERM and firm value. Many companies globally have embraced ERM as a key functional component to their business strategy, but few of the firms can clearly demonstrate the actual value that ERM contributes.

Most studies on the value effects of ERM have been carried out in North America, Europe and Asia, and there are very few studies that have examined the nexus between ERM and firm value among firms listed in emerging market countries like South Africa, using a sample from various industries. This study focused on firms listed on the JSE to determine whether any relationship exists between ERM and firm value, and established the impact of such a relationship. This study had a South African context. It may be argued that even if firms have accepted and implemented ERM in practice, there is no demonstrable impact and value contribution of ERM to firm value. It is therefore essential to determine whether firms listed on the JSE are benefiting from adopting ERM as a strategic investment. This study focused on South Africa, the continent's largest economy, with the biggest securities exchange in Africa. This study augments and adds to the existing ERM literature regarding the association between ERM and firm value.

1.4 Research Questions, Hypotheses and Objectives

1.4.1 Research questions

The following research questions provided direction to address the objectives of the research:

a. What is the effect of ERM on firm performance?
b. What is the impact of ERM on firm value?

1.4.2 Research hypotheses

ERM does not improve firm performance.

ERM does not enhance firm value.

1.4.3 Research objectives

Primary objective

i. To determine the impact of ERM on firm value.

Secondary objective

i. To determine the relationship between ERM and firm performance.

1.5 Research Methodology

This study utilised the post positivism paradigm, which is a quantitative objective method of research. Post positivists examine the associations between dependent and independent variables to obtain results through techniques such as experimentation (Creswell, 2014). A correlational research method was also used in this study. The correlation research study was undertaken to establish whether there was any relationship between variables (Wegner, 2016; Creswell, 2014). Creswell (2014) propounds that correlational research is a statistical test in which a correlation statistic or coefficient is used to examine and measure the degree of association between two or more variables, whilst Wegner (2016) similarly, proposes that a correlation study examines the strength of the relationship between two or more variables.

A quantitative research approach was employed to examine the nature of association between firm performance (and value) (as the dependent variables), and the independent variables for the study. Tustin, Ligthelm, Martin, & Van Wyk (2005) postulate that quantitative research refers to a proactive method of collecting data from a stipulated population and analysing the numerical information displayed. Dimitrov (2008) adds that quantitative research is the reporting or displaying of numerical data, and making sense of outcomes reflected in the observed numerical values.

In this study, the aim was to comprehensively examine, methodically the nexus between dependent and independent variables. Since the positivist approaches assume that the researcher can be independent from the object under investigation,

this study investigated the impact of ERM on firm value using secondary data in an impartial way and without any manipulation of the data (Marozva, 2017). A positivist research approach similar to a quantitative research design were implemented as both are mainly used in methodological contexts regarding cause and effect situations (Bryman, 1984, cited in Marozva, 2017).

This research study used the positivist epistemology because the aim was to decipher multivariate relationships. The main objective of the research was to explain and confirm relationships between independent and dependent variables (Gelo, Braakmann, & Benetka, 2008). Further, the study accordingly used secondary data, and hence did not have any biased effects on the objects under study (Pagach and Warr, 2010; Hoyt and Liebenberg, 2011;).

Additionally, in line with Leedy and Ormrod (2010), this study applied the deductive approach to reveal the correlation between firm performance and firm value (regressants) and the independent variables (regressors). In this research, the explanatory design was used to determine cause-and-effect correlations between variables, which may reveal possible policy implications of the findings, in line with the Marozva (2017) study on the nexus between liquidity (risk) embedded in banks' asset liability mismatches, and its determinants for selected South African banks. The relationships between firm performance (and value) and specific independent variables for selected firms on the JSE were examined using a plethora of financial econometric methods.

1.6 Limitations of the Study

The research relied on secondary data and used a proxy in estimating the model. There might be errors of measurement bias by the primary data collection agency which the researcher may not be able to identify, including errors in audited financial statements. Another limitation of this study was the short span of the available data since it is only covering the period 2000 - 2016.

The estimated models for the study had a risk of model specification errors (model risk) i.e. including irrelevant variables in the model and excluding a relevant variable as specified by Gujarati and Porter (2009). This study used a cross section of JSE listed firms from various industries. Most studies on the value relevance of integrated risk management used a sample derived from only one industry in order to control

differences that might arise from regulatory and market differences across industries. Fixed panel regression analysis was utilised to control for this problem. This study used a stratified and simple random sample from all industries on the JSE. This may enable the generalisation of this study to other industries.

Furthermore, other shortcomings of this research study are the relatively small sample size and our inability to gauge the intensity of ERM usage and maturity levels for the sample firms. These factors may reduce the ability to generalise the findings to various other contexts.

1.7 Significance of the Study

Studies in the academic literature have linked ERM adoption with improved financial results (COSO ERM, 2004; Gordon, Loeb & Tseng, 2009). Some scholars have highlighted problems associated with adopting ERM as a corporate governance ingredient (Segal, 2011). Some companies are rather reluctant to invest in ERM despite some studies advocating for ERM as a key control initiative which also fosters improved firm performance and sustainability. Despite being widely emulated globally ERM has not been extensively implemented by firms (Liebenberg and Hoyt, 2011; Pagach and Warr, 2011). Some challenges to adopting ERM from the aforementioned studies include resistance from corporate executives and the board of directors, confusion of what ERM really is and its purpose as well as the financial investment required to institute and embed such a comprehensive enterprise-wide initiative across the firm.

This study used a cross section of JSE listed firms from various industries. Many studies on the value effects of an integrated approach to risk management use a sample derived from only one industry in order to control differences that might arise from anomalies across industries (Hoyt and Liebenberg, 2011; Pagach and Warr, 2011). This problem was managed through the fixed panel regression analysis. This study uses a stratified random sample from all industries on the JSE.

To the best of the author's knowledge, studies on the value relevance of ERM have been conducted in North America, Europe and Asia (Golshan and Rasid, 2012). Very few papers have been done in an African emerging market context, particularly the South African context. This study enriches the current ERM body of knowledge. Results from this study can easily be replicated across other industries and sectors because ERM leading practices are easily transferable to other settings. This study provides information to senior

management and boards informing them on the value relevance of ERM. This study therefore aims to determine the relationship between ERM and firm value. Understanding these underlying driving factors for ERM adoption will assist firms to understand how ERM can best be deployed in an entity and used optimally to manage all key enterprise risks and thus provide ample platform to capitalise (exploit) relevant opportunities.

1.8 Ethical Considerations

The study relied on publicly available information. However, where there is any sensitivity to the information that was used, the identity of any organisation was protected by the researcher. Ethical clearance was obtained from the ethics committee of the University of South Africa (Appendix 3). The researcher observed research ethics through integrity in analysing and interpreting research results to ensure that the data is not manipulated.

1.9 Structure of the Study

Chapter 1: Introduction

The introductory theme to the report was highlighted. The background and rationale for the study was provided. The statement of the problem was specified, followed by the research objectives, from which the research questions were derived. The importance and limitations of the study were given as well. The significance of the study and ethical considerations were also indicated.

Chapter 2: Literature review

Academic literature related to ERM adoption by firms and their association with firm value are examined and critically discussed.

Chapter 3: Research design and methods

The research methodology implemented to achieve research objectives was discussed. This comprises a discussion of the research design, the data used, and the regression models to be used to obtain research results.

Chapter 4: Analysis and findings

Descriptive, inferential statistics and multivariate analysis are discussed to address the key research objectives.

Chapter 5: Summary, recommendations and conclusions.

Key findings are summarised, synthesised and recommendations are provided. Avenues for further research are also discussed.

1.10 Summary

This chapter discussed the background of the study, the problem statement, research questions and hypotheses, research objectives and scope of the study. The limitations and significance of the study were highlighted, and an outline of the chapters was also indicated. Chapter 2 discusses the literature related to the value effects of ERM on firm performance (and value).

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the theoretical background of corporate governance, provides a theoretical review of ERM, and highlights the empirical literature review on the value relevance of ERM and indicate the key variables and hypotheses for the study.

2.2 Theoretical background of corporate governance

Corporate governance is the framework within which firms and other organisational settings are led and directed. (UK Financial Reporting Council, 2014). The primary aim of corporate governance is to establish a conducive business climate and culture for firms to operate ethically, profitably and in a sustained manner (Cole, 2003). Governance relates to all forms of organisation, whether for profit or non-profit. All organisational settings are therefore created and managed under the same corporate governance standards (King IV, 2016). Companies survive by taking calculated risks on behalf of their owners to create and sustain shareholder value. ERM is therefore at the heart of the risk-return continuum, and influences decisions on the level of risk the firm is willing to accept in return for specified levels of company value.

Risk management, and therefore ERM, compliance, internal audit, information technology, boards of directors and their committees, ethical citizenship, remuneration, among other components, are essential elements of the system of corporate governance for companies and organisations (King IV Report and Code for Governance for South Africa, 2016). The King IV Report (2016) also stipulates that there should be risk management structures to support the overall governance system for an organisation. Risk management is thus a key ingredient that enables the effective corporate governance for an organisation.

Firms obtain capital from global financial markets. These companies should be managed effectively in order to attract the attention of discerning investors and financial analysts. Companies with a poor corporate governance standing are highly unlikely to get additional capital injection should they need it because they have high risk profiles which financial institutions are sceptical of (Corelli, 2015). Similarly, a country with a weak corporate governance standing experiences challenges in attracting capital from financial markets (Coyle, 2003).

The major corporate governance codes in the world include the UK Corporate Governance Code (2014), the US Sarbanes Oxley Act (2002), Australian Corporate Governance Guidelines (2003), The European Union Directive 2006/EC/43 and Council of 17 May 2007 Euro-SOX, Russian Corporate Governance Code (2002), King Report Series for South Africa (KPMG, 2012).

2.2.1 Theoretical review of ERM

2.2.1.1 COSO ERM Integrated Framework

The Committee of Sponsoring Organisations (COSO) of the Treadway Commission issued the Internal Control – Integrated Framework to provide organisations with a well-designed framework to establish sound controls, which assist firms to create and sustain value. (COSO ERM, 2004). That framework is now part of the legal and regulatory system in the US and other parts of the world (Betty and Simkins, 2010). The COSO also published the Enterprise Risk Management – Integrated Framework which builds on the internal control framework to propose an effective holistic approach to risk management.

A key highlight of ERM is that firms are in business to create value for their owners. Firm value is created when companies set targets within appropriate risk limits and employ the correct mix of resources to accomplish the targets. Integrated risk management involves matching risk appetite to corporate strategy, managing a complex set of key risks, and managing opportunities and resources allocation (COSO ERM, 2004).

The COSO ERM Integrated Framework (2004) is therefore characterised by the specification of corporate objectives, within an appropriate business climate, through the identification and management of risks to create and sustain value. This also requires a healthy flow of information to all parts of the firm.

According to COSO (2004), ERM is defined as a model crafted by executives and the board in strategic formulation, to ensure the firms operate and manage undesirable events within specified risk limits in order to accomplish desired corporate objectives. Chapman (2011) suggests that ERM entails the creation and sustenance of value through focussing on shareholder wealth maximisation. ERM is cross-functional, proactive, disciplined, iterative and dynamic, linking all areas of the business.

Largely reflecting on the COSO (2004) definition, Chapman (2011) proposes that ERM may be referred to as a disciplined approach rooted in strategic and operational processes

of firms created by the board to fulfil the primary aim of enhancing the value and assets of the owners of the business.

The aim of ERM is to respond proactively to risk without discouraging calculated risk taking and value creation. Integrated risk management cuts across all functional areas of the business and taps into the interconnectedness between risk categories to create a single portfolio of corporate risks (Mikes, 2009; Kaplan and Mikes, 2012). ERM is not a static process, but dynamic and continuous, requiring frequent adjustments to match the complicated demands of the firm's operating environment (Chapman, 2011).

Therefore, ERM may be described as a detailed and holistic model designed to respond to firm-wide risk to capitalise on business opportunities in the process of creating and sustaining shareholder value. Profits and value creation may only be realised after firms have taken specific risks. Companies should realise that risk management is not only the control of negative events, but also entails seizing appropriate opportunities as they present themselves in the course of business. Segal (2011:24) further adds that ERM is "the process by which companies identify, measure, manage, and disclose all key risks to increase value to stakeholders".

In 2009, the International Organisation for Standardisation (ISO) developed the ISO 31000 Risk Management Standard, which is similar to the COSO (2004) ERM Integrated Framework, which will now be discussed below.

2.2.1.2 ISO 31000 Risk Standards

The International Organisation further recognises the significance of risk management for standardisation, which promulgated principles and guidelines on how risk management may be approached by organisations of all forms. According to ISO 31000 (2009) the principles of risk management include the creation of shareholder value, risk as part of corporate strategy, risk as a proactive and disciplined approach, use of correct information across the firm and the incorporation of behavioural science in responding to risks. Shortreed (2010) further proposes that an integrated risk management framework is a combination of elements for the design, use, adjustment, and frequent enhancements to risk processes across a firm.

Fraser and Simkins (2010) propose that an integrated risk management framework may have components such as a risk policy, the embedment of risk into operational processes of the firm, regular and correct flow of risk information, responsibility and frequent enhancements to the risk protocol. These components are designed to improve strategic and operational processes of the firm and sustain the increase in value.

2.2.1.2.1 The Risk Management Process

According to ISO 31000 (2009) the risk management process includes both a strategic process and a tactical process. The strategic process encompasses the four elements of commit and mandate, communicate and train, structure and accountability and review and improve. The tactical process includes the following elements; establishing the internal and external context, risk assessment (which includes identifying, analysing, evaluating and treating risks), communicating and consulting, and monitoring and reviewing (Shortreed, 2010).

The risk management process, it may be argued, is the centrepiece of the risk management system. Both the COSO Integrated ERM Framework and the ISO 31000 Risk Management Standard, which provides a clear, repetitive, iterative, dynamic, systematic and disciplined approach to risk management, reflect this. The Basel Framework, which embraces the minimum risk management capital requirements, is discussed in the next section. The ERM process is what enables a firm to implement its ERM programme to determine whether a company has realised increased firm value after ERM adoption.

2.2.1.3 The Basel Framework

The Basel Committee on Banking Supervision (BCBS), 1998, created risk management standards for banking firms (Gup, 2010). In imperfect markets, share capital provides a shield to safeguard shareholders from negative financial scenarios. The needed reserves shield firms from the risk of financial distress, moral hazard and activities of self-interested managers (Fraser and Simkins, 2010).

Basel I comprises two tiers. The first tier, is four percent, and consists of equity and cash reserves. The second tier has also four percent with both internal and external capital. Eight percent of risk-adjusted capital was thus needed under Basel 1. Basel II matches regulatory funds with risks to which a bank is exposed.

According to Fraser and Simkins (2010), Basel II has two sides. The first one relates to three pillars, and the second side has firm-wide risk management. The first pillar known as Pillar 1 or minimum required capital, involves market, credit and operational aspects of risk.

The formula for regulatory capital is the required total capital divided by the sum of credit, market and operational risk. The output of the formula should be more or equal to eight percent minimum capital ratio. The supervisory review process, called Pillar 2, requires regular constructive communication between banks and their supervisor(s). Pillar 3 covers prudential market conduct relating to transparency standards.

Integrated risk management or ERM uses economic capital to calculate risk, indicating the approximate required amount of funds to enable the bank to conduct its investment (risk-related) plans (Fraser and Simkins, 2010; Gup, 2010). Economic capital is not regulatory capital required by the bank. The advantage of economic capital is that it calculates and quantifies a myriad of risks as compared to regulatory capital, which measures operational, credit, and sometimes market risks (Fraser and Simkins, 2010).

Bessis (2015) notes that following the 2008 financial crisis, the Basel authorities instituted several action plans to make banks more stress resilient. A number of significant updates to the regulatory framework have been introduced, reshaping the regulations, after the Basel 2 Accord, into the new Basel (2.5 or 3) rules. Key policy enhancements include the Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems, a Revision to the Basel 2 Market Risk Framework, and the Fundamental Review of the Trading Book: A Revised Market Risk Framework (Bessis, 2015).

The Basel Accord, since 1988, when it was promulgated in Switzerland, in the city of Basel to date, is mainly focused on protecting the viability and financial health of the banking sector globally. Market, credit and operational risks are addressed to enable banking firms to manage their risks to within the required risk appetite framework. ERM, with reference to minimum risk adjusted capital requirements revolves at the heart of the system of firm value creation. The risk-return conundrum requires effective ERM programme implementation to enable firms to generate value against a myriad of enterprise risks.

2.3 Empirical evidence on the value relevance of ERM

2.3.1 Value of ERM implementation

Table 2.1 below gives a summary of some of the key researches done so far on ERM and firm value. The table indicates the variables used to signify firm performance and the nature and significance of the results in each study. It is important to realise that most studies have been done mostly in the developed world, mainly the US and Canada, with a few recently done in emerging markets like Malaysia. Some studies (not included in the table below are also examined) relating to ERM and firm value have also been conducted in Europe and Africa.

2.4 The value relevance of ERM

The table 2.1 below illustrates the work of various scholars that underpin the increasing interest and significance of ERM globally. Different research methodologies were employed by researches to decipher the value relevance of ERM to companies. Various levels or degrees of statistical significance indicate the varying degrees of importance and contributions that ERM makes to total company performance and value.

Table 2.1: Empirical evidence on the value relevance of ERM

Authors	**Data**	**Time frame**	**Methodology**	**ERM Proxy**	**Objective: Impact of ERM on**	**Measure for shareholder value (SHV)/ Performance**	**Key result 1**	**Key result 2**	**Significant positive relation** (Yes = Y No = N)
BPW (2008)	120 US firms	1992 to 2003	Linear regression	CRO key terms	Shareholder value / equity market reaction to CRO hire announcement	Cumulative abnormal returns after announcement	No general reaction of market reaction to CRO an-announcement; reaction is firm-specific; mainly for non-financial firms	Significant, positive relation of market reaction (non-financials) to firm size and earnings volatility, negative to leverage and cash ratio	(Y) (company-specific)
HL (2008)	125 US insurance firms	2000 to 2005	ML model	ERM / CRO key terms	Shareholder value	Tobin's Q	Significant positive relation between firm value and ERM	ERM increases SHV by approximately 17%	Y
GLT (2009)	112 US firms	2005	Linear regression	ERM index (created)	Performance	Excess stock market return	Significant positive relation between ERM and firm performance	Relation contingent upon proper match between firm's ERM system and five firm-specific factors	Y
G et al. (2013)	523 US insurance firms	2004+ 2006	Linear regression	ERM activity (survey)	Performance	Cost and revenue efficiency (with DEA)	Significant positive impact of ERM on cost and revenue efficiency depending	CRO or risk committee significant positive effect; but: depends on headquarters being US or not; life insurers	Y

							on ERM activity	benefit from economic capital models	
PW (2010)	106 US companies	1992 to 2004	Logit / matched sample model	CRO key terms	(Financial) performance	Several financial variables	financial variables Significant decrease in stock price volatility after introduction of ERM; no further significant effects	Significant reduction in earnings volatility for firms with positive abnormal returns at CRO appointment date	(Y) (only in sections)
HL (2011)	117 US insurers	1998 to 2005	ML model	ERM / CRO key terms	Shareholder value	Tobin's Q	Significant positive relation between SHV and ERM	ERM increases SHV by approximately 20%	Y
MNR (2011)	82 insurers	(2004 to) 2008	Linear regression	S&P ERM rating (5 categories)	Shareholder value	Tobin's Q	Significant positive relation between increasing traditional RM level (up to first 3 ERM categories)	But: No additional increase in SHV when moving from traditional RM to ERM (to categories four and five)	(Y) (only for improving TRM)
TR (2011)	528 Malaysian firms	2007	Linear regression	Osiris data-base	Shareholder value	Tobin's Q	Positive but not significant relation between ERM and SHV		(Y) (not significant)

Notes: BPW (2008): Beasley, Pagach, and Warr (2008); HL (2008): Hoyt and Liebenberg (2008); GLT (2009): Gordon, Loeb, and Tseng (2009); G et al. (2015): Grace et al. (2015); PW (2010): Pagach and Warr (2010); HL (2011): Hoyt and Liebenberg (2011); MNR (2011): McShane, Nair, and Rustambekov (2011); TR (2011): Tahir and Razali (2011). SHV = shareholder value, ML = maximum likelihood.

Source: Adopted from Gatzert and Martin (2015:16)

McShane et al., (2011) report that the research studies on the nexus between integrated risk management and firm value are inconclusive. An insignificant reaction to the market on employing a chief risk officer (CRO) was found in the Beasley, Pagach and Warr (2008) study. This study decoded a significant relationship in companies in the non-financial sector. The study used examined 120 US insurance companies using linear regression. However, a significant association between integrated risk management and company value was found in the Hoyt and Liebenberg (2008) study, which used Tobin's Q as a proxy for firm value. In this study, integrated risk management was found to enhance firm value by about seventeen percent. In a related context, Gordon et al., (2009) reported that the correlation between a holistic approach to risk management and the value of a firm was hinged on company specific situations. In a similar light, the Pagach and Warr (2010) study showed evidence that when a CRO was hired companies exhibited above average returns and a stabilisation of earnings volatility.

The above-mentioned studies show that the effect of ERM on company value is linked to many interacting variables that may potentially influence the outcomes with firm specific operational settings. The internal factors may include the level of ERM maturity in a firm, the amount of resources availed for ERM, the tone at the top regarding risk management and the industry within which the firm operates. Heavily regulated industries like financial services, health care and the energy sector may have advanced ERM protocols compared to for instance, entertainment and leisure firms.

According to Grace et al., (2015), in a study of 523 US insurance companies, integrated risk management was reported to have a significant positive impact on revenue and cost efficiencies. Thus, ERM cuts across the financial fabric of firms to improve the strategic and operational processes in companies. This resonates well with the notion that effective risk management systems contribute to the financial success of firms.

The McShane et al., (2011) study found a correlation between silo-based traditional risk management (TRM) and firm value. This study found no evidence of value enhancement in companies obtaining superior levels of integrated risk management ratings. The study used the Standard and Poor (S&P) risk management rating as proxy for ERM use. A positive insignificant association was found between a holistic approach to risk management and company value (Tahir and Razali, 2011). These mixed empirical findings point to possible confusion for both academics and practitioners regarding the actual

quantifiable value of ERM. Several methodologies are employed by different scholars in an effort to detect the true value embedded in an ERM system. This quest continues to drive the ERM scholarly agenda, thereby enhancing the risk management body of knowledge.

The Lechner and Gatzert (2017) study represents the first empirical analysis regarding determinants and value of ERM for a European country. The study involved a sample of firms operating in different industries and listed at the German securities exchange, thus allowing a cross-sectional analysis. This evidence further amplifies the methodology regarding the value relevance of ERM by analysing firms in various industries.

It is evident from the aforementioned studies that additional studies are needed in order to demonstrate the impact of ERM on firm value. This study builds on the gaps in knowledge and examines the relationship between ERM and firm value for firms listed on the JSE from various industries. To the best of the author's knowledge, there are no empirical studies in this area of finance for the South African financial market context with specific focus on the JSE.

2.5 Theoretical review on the effect of ERM on firm value and performance

Sharpe (1964), Lintner (1965), Mossin (1966) and the Modigliani-Miller theorem Modigliani and Miller (1958), are the proponents of the capital asset pricing model who contend that firm risk management is unimportant regarding firm valuation. They argue that in a perfect world, investors derive no value from the risk services function. The globally renowned Modigliani-Miller (MM) theorem of finance means that risk management has no benefit to the owners of the business. They propounded that the management of risk events such as strategies on debt or equity or dividend policies have no impact on the valuation of a company.

However, practising risk management can offer tax advantages, increase a company's debt capacity and lower its cost of debt. Firms that practice risk management signify to potential creditors that they are serious about protecting the interests of shareholders and creditors (Chance, 2003). Effective risk management can help a company to avoid bankruptcy costs, and the resulting legal implications.

The capital asset pricing model (CAPM) proposes that diversified share owners of the business should care only about the systematic risk (Hull, 2012). Under CAPM, the return

of a single stock is explained by the return on the share index (Bessis, 2015). Stock return depends on the equity index return.

In general, the capital asset pricing model is computed thus:

$$E(R) = R_f + \beta\,[E\,(R_m) - R_f\,]$$

Where E(R) = expected return, R_f =risk-free rate e.g. rate on US treasury bills, β = beta, and R_m = market return

Total risk equals systematic and unsystematic risk. Systematic risk is cancelled when investors have an appropriately balanced set of investments. Hull (2012) further adds that, under the CAPM, the average investment return should indicate its proportion with respect to the overall market portfolio. The CAPM utilises accumulated data on the portfolio to indicate the nexus between investment returns and total portfolio returns.

Models such as the CAPM have key assumptions, which anchor their usefulness, and reflect the shortcomings of entirely relying on the model. The assumptions of the CAPM, according to Hull (2012) include that the two aspects vital to an investor are the expected return and the risk of the portfolio, the model error terms for various investments are unrelated, the risk-free rate is constant for all transactions, tax is irrelevant, the rate for computing portfolio risk, average returns and correlation is constant. These assumptions unrealistically simplify the financial markets, and may render the model irrelevant in the real imperfect financial markets. Investors and financial analysts should therefore use the CAPM as a guideline and not as a straight jacket to devise investment strategies and decisions in financial markets.

Hull (2012) further proposes that the arbitrage pricing model (APT) can be viewed as an extension of the CAPM. The APT contends that investment returns are affected by several forces in financial markets, including interest rates, the consumer price index, and gross domestic product. The APT further suggests that investors can design portfolios that diversify away negative factors by indicating that average returns are directly correlated to the factors at play.

Practising risk management may help a firm stabilise cash flows in order to ensure adequate amount of funds for capital investment. Chance (2003) further notes that risk management is required in some heavily regulated industries such as banking. Pressure is

also mounting in other industries from shareholders, creditors and the financial analyst community. This is because the practice of risk management makes good business sense.

However, advocates of ERM define it as a set of strategies, tools and techniques designed to scan the environment, identify, and manage a portfolio of risks to create and sustain shareholder interests (COSO, 2004). The development of ERM in practice has attracted more research attention, spearheading the emergence of well-documented risk literature.

Several studies have investigated aspects that motivate the use of ERM by firms (Pagach and Warr, 2010; Hoyt and Liebenberg, 2011; Gatzert and Martin, 2015). Similarly, some scholars have studied the benefits of ERM usage on firm performance (Beasley, Pagach & Warr, 2008; Gordon, Loeb & Tseng, 2009). Moreover, some academics have looked at risk management aspects in different corporate contexts (for example Mikes, 2009; Kaplan and Mikes, 2012). Silo based risk management mainly focusses on the negative, downside of risk. ERM however, embraces both the downside and upside, to take advantage of opportunities that present themselves in the business environment. (Meulbroek, 2002; Hoyt and Liebenberg, 2011).

The Hoyt and Liebenberg (2008) study used Tobin's Q to proxy for the value of a firm (dependent variable). Tobin's Q indicates the relationship between total value of the firm in the market and the price of replacing all assets of the business. According to Tobin (1958) and Hayashi (1982), this model contends that the sum of the values of all firms should correspond to the price of replacing the assets.

Q, Q ratio or Tobin's Q is computed as the sum of the total liabilities (at book value) and the firm's total equity market value divided by total assets (at book value) (Hoyt and Liebenberg, 2011). It was reported, as early as 2005, that about ten studies on integrated risk management had used the Q ratio as a formalised proxy to compute the value of a company.

The 2007 to 2009 global financial crisis that plagued US financial firms caused a turmoil that haunted global markets and confused credit markets in 2008. Some scholars have laid the blame on inept risk infrastructural capabilities. (Fraser and Simkins, 2010). Other studies such as (McShane et al., 2010), contend that it is the widely acclaimed holistic approach to risk management that was the culprit which enabled the unprecedented ravage and damage to financial markets.

There is inconclusive empirical evidence regarding the correlation between integrated risk management, called ERM and different measures of the value of a company. Beasley et al., (2008) examined market response as a result of hiring a CRO. The results indicated a mixed set of directions, reflecting company-specific contexts of value. The study revealed that in companies that are non-financial, market response to CRO hiring is directly associated with company size and earnings volatility. Furthermore, the study found an inverse correlation with respect to leverage and financial slack, using linear regression. Within the same context, Hoyt and Liebenberg (2011) employed the maximum-likelihood treatment effects (MLE) model to uncover the nexus between the holistic approach to risk and the value of a company. Moreover, Gordon et al., (2009) reported that the correlation between integrated risk management and company performance was contingent upon the effectiveness of ERM usage and various company-related aspects. In a similar light, McShane et al., (2011), employed the S&P methods for risk ratings to decipher the nexus between holistic risk management and company value. It is clear from the empirical ERM literature that scholars employ a plethora of methodologies in an effort to uncover and quantify the actual value that ERM contributes to total company value. The evidence seems to signal that to some degree ERM contributes to the enhancement of the value of firms.

A litany of corporate misdemeanours has been widely published in a name and shame campaign drive to instil governance values in organisations across the world. For example, firms like Barings Bank, Lehman Brothers, Enron, HSBC plc, Barclays Bank, Societe Generale, Northern Rock, Orange County, African Bank, British Petroleum Shell, MTN, and many other global players have substantially damaged their share performance on the bourse due to corporate governance and risk management failures in financial markets. These problems indicate challenges in effectively implementing an integrated approach to the management key corporate risks (Mikes and Kaplan, 2009). The aforementioned challenges however, have failed to extinguish the drive towards ERM across the world.

Supporters and scholars of ERM contend that an integrated approach to risk management offers tax benefits, reduces instability of earnings, improves risk-taking decisions, and enhances resource allocation (Hoyt and Liebenberg, 2008; 2011). Some scholars however, for instance Segal (2011) argue that boards and executives may ignore the possibility of using ERM in their firms because it is generally challenging to quantify the actual value in financial terms that ERM contributes to firm value. It therefore means that companies fail

to demonstrate why a huge investment in ERM should be approved when hard figures cannot be explicitly calculated.

Well-documented literature reports that evidence is still relatively scarce regarding how an integrated approach to risk management improves company value (Kleffner, Lee & McGannon, 2003; Beasley, Clune & Hermanson, 2005a). Other scholars have proposed that a company should only implement an integrated approach to the management of risks if company value is positively influenced. The value could be in the form of the minimisation of undesirable events and costs from all risk classes, increased profits, better goodwill and corporate image and operational effectiveness and efficiency.

Credit rating agencies, such as Moody's Analytics, S&P, Fitch and AM Best, play a critical role in financial markets by disclosing the riskiness of players in the markets in order to reduce the cost of doing business and probability of financial distress. Rating firms have increased their focus on risk and thus incorporated ERM into their ratings methodology. This drive has automatically catalysed the use of ERM across the world in order to enjoy favourable credit ratings. Generally, firms with higher Tobin's Q values are those who have effectively invested and embedded ERM into their operational processes, both strategically and tactically. A Tobin's Q value greater than 1 means that the firms is effectively using its assets. A value less than 1 means otherwise. In essence, firms with effective ERM protocols have higher values of Tobin's Q than non-ERM users or poorly implemented projects. A classic example is the Hoyt and Liebenberg (2008) study, which revealed that, insurance companies with a holistic approach to risk management are generally valued above five percent compared to firms without an ERM programme. Smithson and Simkins (2005) extensively studied the value effects of an integrated risk management approach and suggested that the management of risks as a portfolio as opposed to TRM offers many benefits if correctly implemented.

The merits and demerits of adopting an ERM programme are extensively discussed in the literature (Gatzert and Martin, 2015; Hoyt and Liebenberg, 2011). The required financial, human and technological resources needed for successfully embedding ERM across the firm are very high (McShane et al; 2011). A well-crafted and implemented corporate culture and appropriate reward plan are needed for effective ERM usage (Rochette, 2009). To fully reap the benefits of ERM in a firm, a CRO should provide direction to the approved ERM activities of the firm Gatzert and Martin, 2015).

A collection of studies has investigated the influence and interaction of ERM with other corporate governance elements like internal auditing, the board and company executives. The Beasley, Clune & Hermanson (2005a) study, reported a positive impact of ERM on internal auditing. Key factors account for a well-designed and effectively working ERM programme. These factors include a competent, highly qualified and experienced CRO, effective and independent board of non-executive and executive directors, and competent chief finance and chief executive officers who have correct technical corporate governance know-how (Beasley et al., 2005b). An interesting finding in a related study indicated that the nature and composition of the board alone, offers an insignificant impact on the level of ERM maturity in sample firms. However, if the roles of chairperson and chief executive are separated, the quality and level of ERM implementation is generally more advanced than when one person assumes both roles (Desender, 2007).

2.6 Elements of a robust ERM programme

A well-developed and effective ERM programme is the centrepiece of good risk management. Several scholars have investigated factors that are significant in ensuring that ERM achieves its intended objectives, chiefly among them, to improve company value. Academics like Segal (2011) argue that ERM should focus on all risk types, should be part of corporate and tactical strategy, must focus on a portfolio of aggregated key risks and that the holistic approach to risk should be explicitly quantified in financial terms.

Gatzert and Martin (2015) identified key drivers of ERM usage including company size (large companies tend to have more risk complexity than smaller ones), financial leverage, earnings volatility, share price volatility, growth opportunity, dividend policy and institutional ownership. These factors act as both catalysts and a compelling business case for enterprise risk management adoption by senior management and the board.

Other factors which characterise a robust enterprise risk management program include, an effective and independent board and risk committee, the quality of risk technology (information systems), the quality of the CRO and the risk department, the tone at the top (senior management and the board) and the overall corporate culture.

Scholarly propositions indicate that the CRO is pivotal to the success of the ERM programme. It is important that a single, appropriately qualified leader and manager be hired on a full-time basis and afforded executive status in order to function effectively at

both board level and operationally. The CRO should report operationally (administratively) to the chief executive and functionally to the board of directors, or an appropriate committee of the same (audit or risk management committee). Segal (2011) and Hopkin (2013) further add that the CRO should be independent and able to challenge the executive to maintain strategic and tactical decisions within the board approved risk appetite framework. Essentially, executives and the board should explicitly demonstrate their commitment to the corporate risk cause by supporting the CRO in his/her activities. This is central to the fostering of the correct risk behaviours across the firm.

Leading practice advocates for a very small ERM team to augment the CRO's drive for effectively functioning risk management. Certain attributes and qualifications are foundational for the CRO to garner respect among his/her executive colleagues and make a valuable contribution to firm value. A basic competence in disciplines like financial, cost and management accounting, statistics, economics, business strategy, computer science, actuarial science, mathematics, finance and financial engineering, marketing, communications and internal auditing should be required. Knowledge of computer programming is essential as well as a brilliant ability to construct complex risk models and effect sensitivity analysis, stress and back testing. It is vital to have a well-balanced ERM team that complements each other's skill sets, as opposed to having identical strengths and weaknesses in professional competence. It is recommended to have someone on the team of experts who can maintain the usefulness of the risk models and one team player with good qualitative competence in conducting risk assessments, endowed with good communication skills (Segal, 2011). Both a high intelligence quotient and high emotional intelligence skills are needed and expected from everyone on the ERM team of experts.

KPMG (2012) proposed an ERM framework that comprise key related and iterative elements that feed into the entire ERM system and network. The promulgated elements include the governance system for ERM, identification, profiling and assessment of risk, the design of a portfolio of risks, risk communications (messaging) and continuous adjustments, as well as improvements.

A good ERM system should be directly synchronised with the entire organisation in order to be effective. An integrated risk management protocol should involve adequate executive and board level commitment to risk, an appropriate risk organogram, correct risk culture and appetite, well-crafted ERM plan of action and risk sensing technology with predictive

capacity. Chapman (2011) suggests that an intelligent risk management network should direct the assessment of all risk classes to garner real time reporting abilities to all areas of the business.

It is vital that the overall integrated risk management programme picks up and discloses appropriate risk information to all relevant areas of the business. The obliteration of silo based TRM is essential to remove boundaries in various risk handling departments and functions. The design of loss data repositories, risk and control self-assessments, scenario analysis, and key risk indicators is essential in effectively embedding operational risk management (Frigo, 2009; Blundell and Thirlwell, 2010; Young, 2012).

ERM is a specialised function within an organisation which requires substantial resources to enable its effective implementation. Senior management and the board are therefore instrumental in ensuring buy in by all stakeholders. A robust world-class ERM programme also needs independent review by competent external parties to give reasonable assurance that key corporate objectives are achieved. The degree of ERM implementation and maturity levels affects the benefits that accrue to the firm and the impact of firm value that is ultimately realised.

The CRO should be a forward-looking risk advisor and expert and should have the ability to communicate with all areas of the firm. Various tools and techniques could be deployed to assist the CRO in embedding the relevant risk behaviours and culture. The CRO could use information technology and telecommunications to communicate via email, websites, internet telephony, skype, tele- and video conferencing, telecommuting, among other seamless methods to foster the right risk culture across the firm. The head of risk or CRO should be strategic and avoid being confined to focussing on local, current operational issues. She or he should unravel hidden trends, risks and complex scenarios in the firm, which could potentially damage firm value in future (Duckert, 2011).

The ERM executive should be able to decode risks hidden in strategic and tactical transactions, executive conversations, inappropriate executive conversations, mergers and acquisitions, consolidated financial reporting, fraud and corruption and various other potential corporate misdemeanours. Thus, the CRO should decipher problems before they harm the financial health of the entity. It is also essential that the executive in charge of ERM should discern, identify and disclose key potential opportunities to prevent firm

rivalries from capitalising and exploiting deals before the firm can salvage anything (Duckert, 2011). A key reason that adds to the value of the ERM head is the ability to provide advisorial (consulting) services to board level requests and to demonstrate the use of more advanced levels of thinking beyond current solutions and accepted contemporary problem-solving methodologies and techniques. This requires a deft touch of diplomacy and bravery and challenge of one's superiors in order to inculcate the need to do the right thing for the firm.

2.7 Benefits of ERM

An integrated risk management system helps companies to become more profitable by reducing costs and increasing revenue generation. ERM fosters a highly disciplined culture, which can translate to higher levels of executive and operational productivity. The incorporation of ERM into the performance agreements of corporate executives and all employees of the firm, demonstrates the board's commitment to strict integrated risk management standards that permeate and cascade throughout the firm. A fully functional ERM programme links all critical risk generating areas of the business into an integrated portfolio monitored by the risk executive and the board. The advantage of ERM is that all risks are assigned to responsible risk owners and action plan owners who should be answerable regarding all specificities of the risk concerned. Segal (2011) propounds that effective ERM usage may enable firms to enjoy favourable credit ratings, and improve corporate stakeholder relationships, for example with supervisory authorities, in the case of banks and other financial institutions.

ERM may be implemented in any organisation. However, it is the quality of the ERM programme that distinguishes whether firm value may be increased or diminished thereby. KPMG (2012) reports that some of the key benefits of improved ERM include improved speed of risk response, cost minimisation, revenue improvement, better natured stakeholder relationships, improved investor confidence and sentiment, better corporate governance standing, and an enhanced financial governance and assurance climate.

Several other ERM benefits have been reported in the literature. The use of ERM may enable a company to adhere to legal and regulatory requirements and reduce the costs of potential penalties and fines in case of breach of law. Multi-functional risks can be aggregated into a single portfolio of risks managed by the CRO and governed by the board.

Upside risks can be exploited and taken advantage of. Chapman (2011) notes that non-risk management employees of the business become risk savvy and are able to manage risks inherent to their areas of concern through a well-designed training and communications system to capacitate all organisational stakeholders on how to respond to risk. ERM is now being recognised as a major function of the business in many companies, because of factors like risk management has become highly complex, needing commensurate skills sets, the decline of insurance as a risk financing mechanism and a better risk awareness culture as suggested by Valsamakis, Vivian & du Toit, (2011).

Risk management enables a company to survive financial crises and periods of financial distress. Thus, a business may survive to live another day, decade or century if it instituted a robust approach to risk which responds to risk in an aggregated manner. Valsamakis et al., (2011) assert that risk management is a formalised department in a firm that is charged with safeguarding all resources from the dangers inherent in the business environment. Bessis (2015) argues that the allocation and rationing of capital, transfer calculations and monitoring financial results are essential in addressing risks for banks.

Moody's (2004) Enhanced Analysis Initiative (EAI) focusses on the following key risk areas to evaluate firms' credit worthiness; financial reporting assessment, corporate governance assessment, liquidity risk assessment, off-balance risk assessment and assessing the quality of risk practices. These factors clearly signal whether or not a company is being managed as per leading governance standards.

2.8 Challenges in effectively implementing ERM

Segal (2011) argues that some companies purport to have an ERM program in place, when in fact they merely have a series of compartmentalised risk management activities entrenched separately in different functions without any meaningful coordination to warrant ERM programme activity. Thus, firms may end up confusing the presence of an ERM programme with traditional risk management (TRM) activities that may only register pockets of value in companies. Moreover, firms may need to understand exactly what ERM is and also what ERM is not.

The primary objective of any profit maximising firm is to generate shareholder value for the firm's shareholders and other stakeholders (Chapman, 2011). Senior management and the board are more interested in any initiative if it either directly or indirectly generates firm

value. ERM is a specialist corporate function that may indirectly contribute to firm value because it is not a risk-taking function, but a risk-monitoring one, and part of the three lines of defence mechanism of the firm's internal control system.

When done correctly ERM requires a substantial investment in human, financial and information technological resources (Hoyt and Liebenberg, 2008; 2011). Company executives may be reluctant to invest in ERM due to insufficient information about the value of such an investment. Recent studies have also highlighted the problems in computing the real company value of ERM to firms (McShane et al., 2011).

Some studies have indicated that the use of ERM is problematic and confusing given factors such as inability to design a correct portfolio of risks, developing a risk repository or database, and the use of risk-based economic capital computations to direct strategic decision making within approved risk appetite frameworks. Nocco and Stulz (2006) assert that these technical issues may stall the potential value that could accrue to firms after adopting an integrated risk approach.

Some scholars state that ERM is now highly developed and has been welcomed by firms across the world. It is expected that those companies who embrace it invest in substantial resources in order to realise its full potential. Research into the benefits of ERM is clearly being outpaced by the quest for more answers on how ERM can best be deployed and utilised at full throttle. Fraser and Simkins (2010) note that ERM is a metamorphosis of TRM and therefore become the new approach to responding to firm-wide risks.

ERM research suffers from insufficient well-developed variables that measure ERM maturity level. There is also a scholarly debate that probably firms of the future may not require the services of a CRO because all risk owners in the firm become risk managers competent enough to address all undesirable events to which they are exposed. ERM is inextricably embedded into the lifeblood of the firm (Fraser and Simkins: 2010).

There is a problem that key company executives, like the chief finance officer or chief executive officer, might lack the requisite technical ERM knowledge and abilities. This could hurt the entire firm because the reduced capacity and understanding may thwart the potential of the ERM programme to contribute meaningfully to enhancing company value and profitability. Yener (2010) argues that this deficiency may affect the ability of the firm to survive in times of financial distress.

Change and project management capacity is required to effectively implement risk management across the firm. Unfortunately, sometimes firms are dragged into accepting ERM due to external forces. For instance, Kleffner et al., (2003) found that about two-fifths of respondents revealed that Toronto Stock Exchange requirements were a key factor in instituting ERM, and about half of the respondents indicated board level involvement in the decision to use ERM. About three-fifths highlighted that the hiring of a CRO automatically ignited ERM use in the firms sampled. Some research indicates that ERM may be poorly implemented due to resistance to change, and an inappropriate value system coupled with inadequate skill sets.

However, some elements in the research community blame risk management as the key cause of the financial turmoil that haunted the financial markets during the 2007 to 2009 financial crisis. Risk management is the responsibility of management, and the board is accountable for the oversight and governance thereof. ERM experts appointed to guide risk processes are not solely responsible; management should not abdicate their risk mandate to these risk experts. Stulz (2009) contends that risk should be managed at source by those charged with a particular area of responsibility.

A key ingredient for an effectively functioning ERM protocol is independence. A CRO should not be a “yes” person, who dances according to the tune of all stakeholders. The CRO should be firm, assertive, diplomatic and should challenge management if they breach approved risk limits. Da Costa Lewis (2012) asserts that independence ensures respect for the CRO at the boardroom table. Thus, independence fosters open, honest dialogue around the boardroom table to protect shareholder interests and mitigate agency costs while thwarting the moral hazard. This may enhance the quality of the ERM programme and perhaps increase firm value.

In the Group of Thirty (G30) Guidelines and Recommendations, it was stressed that risk management must be fully independent of the risk-taking business functions. Individuals responsible for risk review aspects, such as risk managers, internal audit, and compliance professionals, must report functionally to the board or an appropriate board committee, and operationally to the chief executive. This enables the independence element to be safeguarded and maintained.

The CRO must be independent from risk-taking business units and report directly to boards and senior management who are not involved in risk taking activity. A separate oversight and reporting structure distinct from audit and financial issues is required.

Da Costa Lewis (2012) asserts that it is essential to gauge the level of CRO independence in a firm. A distinct organogram reflecting clear and separate reporting lines should be established for those who guide the risk process. The risk structure should be separated from that of those responsible for value creation. The CRO and the ERM team should not be involved in risk-taking projects. It is recommended that risk managers remain risk managers and those taking risks remain taking risks.

The golden rule of risk management (independence) underpins the ethos of risk management. This implies risk management's ability to function as a place for rational, impartial expression, incorporation of knowledge, questioning conventional wisdom, and clarifying the analysis of the level of risk relative appetite and tolerance. Neither the rules of advanced mathematics, statistics, computer science nor laws and regulations can advance one's understanding of risk management very far, if one fails to understand, accept and embrace the concept of independence in risk management.

The major challenge for senior executives and boards of directors is to synchronise the respect for the risk function with the risk-taking strategies and plans of business functions responsible for risk. A multiplicity of corporate scandals globally has highlighted the increasing need for the risk function to be entrusted with adequate and appropriate authority to monitor all risk-taking functions of the organisation without fear of retribution and retaliation, which might supposedly thwart the career progression for risk managers.

The right risk behaviours should be fostered into the fabric of the organisation to ensure that the stature of the risk management effort is established and maintained across the organisation. Listed corporations globally may espouse to the fundamental rules of risk management, which have the best interests of shareholders and other stakeholders at heart. Huge bonuses and performance related remuneration may blind side key senior executives when catastrophic risks are lurking in the darkness veil of the organisation, unbeknown to non-risk professionals. Risks taken by an organisation should be within the board's approved risk limits. Agency costs and how to mitigate them must be a key agenda point for board meetings.

Some scholars have reported further problems associated with instituting an ERM programme, namely the failure to calculate and reduce strategic and operational risks into financial figures, the inability to compute risk limits that function effectively and the failure to synchronise an integrated approach to risk management with the strategic management processes of the business. Segal (2011) adds that ERM programmes may fall short of expectations due to their failure to meet key requirements for a well-designed ERM system. The elements include risk portfolio focus, risk measurement, extensive flow of risk information, independence of the CRO, and a firm-wide approach. The absence of key ERM benchmarks (discussed above) may thwart the quality of an ERM project despite a huge financial injection to kick-start the process.

The ERM program in an organisation requires substantial resources (human, financial and technical), adequate time and appropriate board and executive level commitment. Key senior executives need to model the correct risk and reward behaviours across the organisation. The company must reward and compensate the right risk behaviours and penalise inappropriate risk activity by all staff across the corporation. Leading practises are advocating for risk management to be part of the senior management's performance agreements, which then cascade into the operational ethos, modus operandi and lifeblood of the organisation. Segal (2011) laments that ERM is a simple process on paper, but a complex one when effectively implementing it (as the old adage goes, "easier said than done").

The discipline of ERM is further made more sophisticated by its inextricable linkage to other disciplines like computer science, mathematics, statistics, behavioural science, econometrics, finance (financial econometrics), actuarial science, accounting, insurance, law, and management. ERM is thus a thread woven from various specialisms in business which demands highly specialised talent to craft, manage, lead and operationalise its intricate web of activities across the organisation. These reasons make ERM talent a highly scarce resource, which translates into why highly qualified, experienced and competent senior ERM executives are paid huge salaries and bonuses when they meet their performance agreements or contracts.

It may be argued that when senior management and the board avail adequate and appropriate resources for ERM, give it enough support and are involved, ensure adequate

risk governance structures are in place, and provide regular governance oversight, the overall firm value may be enhanced and accentuated.

2.9 Summary

This chapter highlighted the theoretical overview and review of corporate governance and an integrated approach to risk management, and highlighted the empirical literature review while indicating the various variables and their relationships. The value relevance of a holistic risk management approach was also discussed. Chapter 3 discusses the research methodology employed to address the objectives and hypotheses of the study.

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

This chapter addresses the research methodology that was employed by the research study and highlights the tools, techniques and methods, which were deployed to accomplish the objectives and hypotheses of the study. The nature of data to be collected, the data analysis and the formulation of research hypotheses are indicated.

The primary aim of this study is to examine the impact of ERM on firm performance (and value) for companies listed on the Johannesburg Securities Exchange (JSE). The study examines the actual impact that ERM has made from the year ERM was instituted and determine the difference if any in value. The nexus between ERM and firm performance (and value) was also be investigated. The techniques, tools, and the multivariate regression models that test the relationship between ERM and firm performance (and value) will be discussed. A discussion on the research employed is also be provided.

3.2 Research paradigm and design

Saunders, Lewis, & Thornhill (2012) describe research design as the roadmap or plan in which the research provides solutions to the research objectives, or hypotheses of the study. Gelo, Braakmann & Benetka (2008) assert that research design is the operating framework that links the key foundational elements of a research strategy or design.

This study adopted the postpositivism worldview, which is a quantitative scientific method of research. Postpositivists employ a predictive paradigm, which reflects and indicates results or outcomes (Creswell, 2014). A correlational research methodology was also used in this study. The correlation research study was utilised to determine if there was any association between variables in the study (Creswell, 2014; Wegner, 2016). Creswell (2014) propounds that correlational research is a statistical test in which a correlation statistic or coefficient is used to examine and measure the degree of association between two or more variables, whilst Wegner (2016) similarly,

proposes that a correlation study examines the strength of the relationship between two or more variables.

The quantitative research strategy was employed in this study to examine the nature of association between firm performance (value) (as dependent variables), and the independent variables for the study. Tustin, Ligthelm, Martin, & Van Wyk (2005) postulate that quantitative research refers to a formal proactive, and disciplined way of gathering primary data from a large population under study, filter or sift some information out of these data and then infer the results of the study to other contextual settings. Quantitative research is the reporting or displaying of numerical data, and making sense of outcomes reflected in the observed numerical values in order to infer the findings to other environments Dimitrov (2008).

This study focussed on investigating comprehensively and methodically the nexus between dependent and independent variables. The positivist approach was employed to investigate the impact of ERM on firm value using secondary data in a direct and impartial way and without any manipulation or biased changing of the selected datasets (Pagach and Warr, 2010; Hoyt and Liebenberg, 2011; Grace et al., 2015). The positivist epistemology was selected and utilised in this study because the objective of this research was to examine the interaction and behavioural effects of the dependent and independent variables. The main objective of the research was to explain and confirm relationships between independent and dependent variables (Gelo et al., 2008). The study used readily available secondary data which provided a convenient and quicker method of collecting data for analysis, in line with (Pagach and Warr, 2010; Hoyt and Liebenberg, 2011; Grace et al., 2015).

According to Leedy and Ormrod (2010) and Van Zyl (2014), this study followed the standards of quantitative research by applying a predictive approach to research in order to reveal the correlations between dependent and independent variables. In this research, the descriptive research design was used to analyse relationships between variables, in line with the Marozva (2017) study on the nexus between liquidity (risk) and its determinants for selected South African banks. The relationships between firm performance (and value) and specific independent variables for selected firms on the JSE were examined using a plethora of financial econometric methods.

3.3 Other methodological issues

The main aim of this study was to determine the value effects of ERM on firm value from the year of first usage and examine the difference in value if any. This study uses a stratified random sample of 45 firms selected from all firms listed on the main JSE from 2000 to 2016.

Pagach and Warr (2010) found that companies using a holistic approach to risk management do so for economic benefits rather than to comply with the rules of the authorities and those highly leveraged companies need to pay more attention to their risk portfolio. Aebi, Sabato and Schmid (2012) analysed ERM attributes' effects on the performance of banks during the US subprime mortgage problem of 2008. It was found that those banks whose ERM executives reported functionally to the board exhibited superior results to other banks. In a related study by Hoyt and Liebenberg (2011), which studied the benefits of integrated risk management on company value, it was found that companies, which have an ERM programme in use, reported a value of about twenty percent higher than non-ERM users.

The Ellul and Yerramilli (2013) research study developed an integrated risk management index to gauge the level of risk control effectiveness in US listed firms. The result showed that bank holding companies with a superior index in 2006 operated better and exhibited low risk ratings in total. These findings support the notion that strong internal risk controls could lead to the lowering of risk in bank holding companies (Chuang, Lin, Shi and Tsai, 2017). Grace et al., (2015) investigated which aspects of ERM usage enhances the value of a firm, in a sample of US companies. The study found significant improvements in cost and revenue efficiencies due to integrated risk management.

In the past two decades, the empirical studies and literature on ERM has proliferated. Several studies have examined factors that contribute to the adoption of ERM (Liebenberg & Hoyt, 2003), and some indicate that ERM usage is influenced by the company size and complexity. Other scholars investigated the effects of integrated risk management on firm performance and value (Hoyt & Liebenberg, 2011; McShane et al., 2011). Beasley, Branson and Hancock (2010) state that the implementation of

integrated risk management in US firms is relatively undeveloped. In contrast, Ahmad and McManus (2014) found higher levels of ERM maturity in Australian companies. Pagach and Warr (2011) indicated that firms with more financial leverage, limited financial slack, high assets opacity, and unstable earnings capacity benefit more from integrated risk management. Their study on over one hundred US firms shows a substantial reduction in share price movement and instability after instituting integrated risk management. The evidence indicated superior results for companies with above average returns. Grace, Leverty, Phillips, and Shimpi (2015) found substantial direct effects of integrated risk management on cost and revenue efficiencies on over five hundred US companies.

Hoyt and Liebenberg's (2008) study showed a high correlation between integrated risk management and firm value. The findings of this study found an enhancement of firm value of about seventeen percent after implementing integrated risk management. The Hoyt and Liebenberg's (2011) study on over 100 companies also shows a twenty percent improvement in company value. The study of ERM managers in the US conducted by Gates, Nicholas, and Walker (2012) found that ERM usage improves and stabilises earnings volatility, profitability, and the ability to reach corporate objectives.

Eckles, Hoyt & Miller (2014) found a substantial drop in equity return volatility of integrated risk management firms. This study identified that earnings per unit of risk improved upon instituting integrated risk management. In a recent study, Edmonds, Edmonds, Leece and Vermeer (2015) find that the quality of risk management systems reduces earnings volatility for loss-making firms by significantly increasing their market valuations. However, Tahir and Razali's (2011) study finds a direct insignificant nexus between integrated risk management and firm value. Similarly, the McShane et al., (2011) study of eighty-two companies indicates a high correlation between TRM and company value.

In another research, Lin, Wen and Yu (2012) found an inverse association between integrated risk management and company value. They argue that at an infancy level of ERM adoption, it is difficult for financial analysts to decipher the value of ERM and may deem it too expensive a project which may fail to account for the high financial costs required to establish it. Despite the inconclusive findings on the benefits of

integrated risk management, the theoretical argument that ERM improves firm performance and firm value continues to be tested by scholars in many parts of the world. In emerging and transitional economies like South Africa, the rapid and widespread adoption of market-based policies (privatisation and opening to foreign markets) expose local firms to strong competitive pressures both in the local and global markets (Hoskisson, Eden, Lau, & Wright, 2000; Kommunuri et al., 2016). Consequently, listed firms in emerging economies like South Africa, see the need to develop strategies to cope with a complex set of global risks. Improving a firm's management control systems helps businesses implement proper risk management practices effectively in an integrated manner. Kommunuri et al., (2016) further add that in emerging markets the lack of credible institutional frameworks such as the legal framework and other tools for a conducive and enabling environment that provides the basis for effective corporate governance and transparency has been the main cause for the limited support and acceptance of ERM programmes.

The history of South Africa plays a key role in this country's economic development. After 1994, South Africa opened its markets to the world. South African firms were then exposed to global competitive pressures, new corporate governance reforms, and a new legal and regulatory framework to carry the new player onto the global business landscape. Therefore, various risks (political, economic, technological, socio-cultural, legal and ecological) threatened its economic prosperity ambitions (Pollin et al., 2009). South Africa, Africa's largest economy, has performed relatively well in the past two decades, and has qualified as an emerging economy. Firms that outclass their rivalries on the global business landscape are those that take calculated risks and engage in competent risk and opportunity management within board approved risk appetite and tolerance frameworks (Segal, 2011). It is a known fact, that, the private sector is the engine of economic growth globally (Pollin et al., 2009). Therefore, ERM, as a firm-wide corporate, board-approved process, is essential in the creation, protection and sustenance of shareholder value, firm performance and firm value. Consistent with the prior empirical literature discussed earlier, the study hypothesises that proper ERM adoption does not enhance firm performance and firm value.

Accordingly, the following hypotheses have been proposed for this study:

ERM does not improve firm performance.

ERM does not enhance firm value.

Firm performance relates to historical accounting-based measures of value. Accordingly, return on assets (ROA), consistent with prior ERM empirical literature is chosen (Hoyt and Liebenberg (2008). Furthermore, firm value reflects the future expectations of investors (market-based measures of value), hence the Q ratio is selected to compute company value in this study, in line with the Kommunuri, Nayaran, Wheaton, Jandug & Gonuguntla (2016), Hoyt and Liebenberg (2011), and the McShane et al., (2011) studies.

The following techniques have been used to investigate the benefits and value effects of integrated risk management on company value and the correlations therein:

This study used a cross section of JSE listed firms sampled from various industries, including industrial metals and mining, financial companies, consumer services (media, retail, travel and leisure), healthcare (healthcare equipment and services, pharmaceuticals and biotechnology) and, telecommunications (fixed line and mobile telecommunications). Most research on the effect of integrated risk management on firm value use a sample derived from only one industry to control for possible endogeneity.

Only publicly traded companies are used in this study in order to have access to evaluate market-based value. It is also more likely that a firm's initial year of implementing an ERM programme is identified for firms with publicly available data. Public disclosures of ERM activity are easily identifiable for publicly traded firms (Hoyt and Liebenberg, 2011).

The initial sample is drawn from the Iress INETBFA research database. This study is limited to the 17-year period, from 2000 to 2016. The establishment of an integrated risk management system for the sampled companies from 2000 to 2016 is examined through a strongly balanced panel of 663 firm-year observations.

The next step is to identify the activities of ERM implemented by each firm. In South Africa, it is not legal and mandatory for firms to disclose whether they have implemented ERM. Thus, a similar method to the Hoyt and Liebenberg (2011) study is used to conduct research for evidence of ERM activity through annual reports, media and google search. Google is initially used as the main search engine to process key

word searches for each company (Kommunuri et al., 2016). The search technique includes the following phrases, acronyms, synonyms, as well as individual words within the same paragraph: “enterprise risk management”, “integrated risk management”, “holistic risk management”, “enterprise-wide risk management”, “risk committee”, “head of ERM”, “CRO”, “risk office”, “risk control office”, “risk framework”, “ERM framework”, enterprise-wide risk management framework”, and “risk system”. The context of each “hit” is manually reviewed to ensure compliance with the definition and descriptions of ERM. This ensures that each recorded successful “hit” related to integrated risk management is registered. This procedure is similar to the study by Hoyt and Liebenberg (2011). The earliest evidence of integrated risk management usage is in late 2001, and all of the remainder were registered between 2001 and 2016. The beginning year of ERM activity is distinguished by examining annual reports, media and search engine results. The contents of these searches at least contain a section for risk management. An examination of this risk management section then determines if the report matches ERM activity, in order to classify the search as a successful “hit”. This then confirms as the firm’s initial year of engaging in ERM activity.

The decision of whether a firm applies ERM in any given year is determined by using a dummy variable. The dummy variable for ERM is assigned a zero, until the beginning of the year that the firm engages in ERM, that is, once a firm starts to adopt ERM, the dummy variable equals 1, as an indicator. After identifying the initial year of ERM activity, firms with missing values in their financial statements for sales, assets, equity, beta and dividend declarations are excluded. Appendix 1 depicts a high-level overview of what constitutes a “successful hit” and “not a successful hit”, in the process of searching for ERM adopting firms from various data sources such as the audited annual integrated reports and corporate governance pronouncements. The next section discusses multivariate regression to address research objectives.

3.4 MULTIVARIATE REGRESSION

The methods that were employed to determine the effects of integrated risk management (ERM) on company value, and the relationship between ERM and firm value comprises the Generalised Method of Moments (GMM) Model, as part of the multivariate regression analysis, and correlation analysis.

The primary aim of this study is to investigate if firms on the JSE in South Africa benefit from the use of integrated risk management, and how much value is created due to ERM usage. The Q ratio is used as a formalised proxy for company value in line with the (Hoyt and Liebenberg 2011; Kommunuri et al., 2016) studies. The Tobin's Q model, which accounts for the value of ERM engagement is then modelled. This study aims at establishing the association between integrated risk management and firm value. One approach to this process is to regress integrated risk management as a function of ERM and other value determinants. The disadvantage of this option is that it disregards the challenge of endogeneity (Hoyt and Liebenberg, 2011), which can distort the overall results of the study. This implies that autocorrelation could significantly affect the results of the study because of the problem of interdependencies and correlations amongst the variables. This study employed a collection of methodologies as a control for this problem. The procedure is further explored below.

3.4.1 Specification of the financial econometric models

A quantitative analysis of the complete spectrum of variables under investigation is reported to give a brief overview before a comprehensive analysis of the study is provided. The study focused mainly on the value effects of integrated risk management on firm value and the correlations between dependent and independent variables. The study conducted an examination on the correlation between firm performance (and value) and company size, financial slack, financial leverage, sales growth, assets opacity, dividends, international diversification, earnings volatility, beta and return on assets, using panel data from 45 selected listed companies from the JSE in South Africa. There are several similar studies which have employed a related methodology from economic and financial disciplines (Hoyt and Liebenberg, 2011; Grace et al., 2015; McShane et al., 2011; Kommunuri et al., 2016, Abdullah et al., 2017).

The source of the secondary data employed in the sample for this study was obtained from the iress INETBFA (McGregor) database as well as published integrated reports of the sample firms. All companies in the sample are South African. This study utilised the generalised method of moments (GMM) model. Company and time specific

dynamics are accounted for under this method (Hansen, 1982; Gujarati & Porter, 2009).

There are advantages and disadvantages of using panel data. Panel data can be utilised when the study is dealing with a specified number of companies operating or existing, over time, which implies that there might be a possibility of autocorrelation amongst these sampled firms. Panel data assumes that the companies under examination are not related. Scholars usually prefer dynamic panel data because it manages the problem of heterogeneity as opposed to other studies, which do not control this problem. The heterogeneity condition has an effect of distorting the findings of the study resulting in incorrect inferences being drawn from the data. (Hsiao, 2003; Baltagi, 2008).

Baltagi (2008) further propounds that not controlling the problem of heterogeneity could create further challenges such as misspecification of the multivariate regression equations. This is called model risk, which implies that the models specified for the study are riddled with major technical errors, which may render the analysis worthless. Moreover, panel data enhances the quality of the study by allowing for more refined statistical accuracy, which translates to better findings. A large number of items may be used for the study under pooled panel data than other techniques involving mainly time or cross section in nature (Baltagi, 2008). A key drawback of panel data is that it fails to adequately manage and control studies involving very long-time periods and involving transnational or intercontinental variations, which degrade the quality and robustness of the equations or regression analysis (Baltagi, 2008). These drawbacks of panel data have been adequately controlled for because this study focussed on only one country (South Africa). Moreover, company and industry specific factors have been included as part of the financial econometric models.

This study utilises the Hausman (1978)'s test which was employed to choose between the use of the fixed effects model (FEM) or the random effects model (REM). Academics are grappling on the choice of these two methodologies. The decision to select either of the two techniques is best left to inferential statistics which provides an

objective, unbiased quantitative decision (Baltagi, Bresson, & Pirotte, 2003; Marozva, 2017).

3.4.1.1The generalised method of moments (GMM)

The Generalised Method of Moments or GMM was the predictive method utilised in this study. Hansen (1982) is widely known as the architect of the GMM methodology. The main merit of the GMM technique is that it can work with incomplete ranges of data since only identified or specified moments are required to use the estimation model. This attribute is the reason why scholars may prefer the GMM model to for example, the maximum-likelihood treatment effects (MLE) model. This is critically important in situations where data has several incomplete pockets in it. Furthermore, in cases where full datasets are available, the MLE often requires a lot of time and effort to employ, as compared to the GMM model, which can be computed in a short space of time without extensive calculational efforts (Hansen, 1982).

Scholarly literature suggests the employment of both the random effects and fixed effects (RE/FE) methodologies within different contextual settings. These techniques are based on distinct notions. Company and time related aspects are controlled under fixed effects methodologies, thereby accounting for impartiality or unidentified bias in the variables (Pitelis and Vasilaros, 2010; Boţoc, 2015). Conversely, the random effects methods do not control for unidentified variations in the error term. The challenge of endogeneity is addressed effectively under FE methods (Boţoc, 2015). Marozva (2017) adds that regression models that are dynamic control for hidden problems of autocorrelations and unidentified and undesirable relationships amongst variables under investigation. This helps to curb model misspecification and prevents the production of wrong inferences and incorrect results, which may point to a large wastage research effort and funds.

There is always a risk that the models adopted for a specific study might omit significant variables, which have a major effect on the dependent variable. In linear regression analysis, this problem is controlled by employing the concept of lagged, dependent variables, which reduce model misspecification (Wintoki, Linck & Netter, 2011). Under GMM methodologies, the technique of instrumental variables is utilised to control

unidentified variables with a major influence on the variables in question. This method corrects for endogeneity. Arellano and Bond (1991) developed the GMM-in-first-differences (GMM-DIFF). This model enables the regression model to have predictive capacity in first differences, at the same time utilising variables that have been lagged behind (both regressor and regressants). This involves the use of instrumental variables. Scholarly literature that has extensively tested the model contend that the GMM-DIFF methodology may not be reliable since the model instruments might be invalid. Blundell made a further refinement to the GMM-DIFF and Bond (1998) who suggested a method termed GMM-SYS (GMM system). This technique employs instruments-in-first-differences obtained from the respective variables at levels in the study. If the specified variables have been changed in first differences in the regression model, they are subsequently deployed as instruments. The validity, reliability and accuracy of the GMM-SYS is contingent upon whether the instruments are valid or not as well as if various forms of autocorrelation are not present in the specified model. A more advanced development on the GMM called 2 step GMM-SYS is a better option because it employs corrections for the regression model errors and correlations amongst companies and other omitted significant effects from variables. In order to design a valid multivariate regression model with good predictive capacity, this study uses a stochastic, dependent variable, lagged (over 1 period), as specified below.
The formal GMM model has the following functional form:

$$y_{i,} = \alpha y_{i,-1} + \beta x_{i,t} + \mu_i + \varepsilon_{i,t,} \quad \text{.....(1)}$$

Where,

$y_{i,}$ = a company value measure for company *i* over the period, *t;*

$x_{i,}$ = values of explanatory variables for company *i* over the period, *t,* in other words, company-specific factors which have an impact on the regressant (s);

α is = gradient of the lagged company value variable;

β = rate or degree of change or the elasticity of the explanatory variables;

μ_i = FE in company *i*;

$\varepsilon_{i,}$ = regression model error term; and

i = cross-section and *t* = the time-series aspects.

Similar studies have controlled for company-specific variations, therefore, the first difference of the GMM regression model, specified in model (1) is explicitly formalised and specified, thus:

$\Delta y_{i,} = (1-\alpha)\Delta y_{i,t-1} + \beta\Delta x_{i,t} + \Delta\varepsilon_{i,t}$ ……(2)

Model (3), below, tests the nexus between integrated risk management (ERM) and company performance (ROA). Return on assets is regressed against a combination of variables. The regressor and regressants are specified explicitly in detail below.

The functional form of the multivariate regression model is specified as follows:

$\Delta ROA_t = (\phi-1)\Delta ROA_{i,t-1} + \lambda_1\sum_{i=1}^{n}\Delta\mathrm{ERM}_{it} + \lambda_2\sum_{i=1}^{n}\Delta\mathrm{SIZE}_{it} + \lambda_3\sum_{i=1}^{n}\Delta\mathrm{LF}_{it} + \lambda_4\sum_{i=1}^{n}\Delta\mathrm{SG}_{it} + \lambda_5\sum_{i=1}^{n}\Delta\mathrm{DIV}_{it} + \lambda_6\sum_{i=1}^{n}\Delta\mathrm{AO}_{it} + \lambda_7\sum_{i=1}^{n}\Delta\mathrm{FS}_{it} + \lambda_8\sum_{i=1}^{n}\Delta\mathrm{EBIT}_{it} + \lambda_9\sum_{i=1}^{n}\Delta\mathrm{IDIV}_{it} + \lambda_{10}\sum_{i=1}^{n}\Delta\mathrm{SG}_{it} + \lambda_{11}\sum_{i=1}^{n}\Delta Dummy_{it} + \Delta\mu_{i,t}$……(3)

Furthermore, the correlation between integrated risk management (ERM) and firm value was analysed, where Tobin's Q (TQ) was the regressant while size, leverage factor, financial slack and other independent variables were part of the regressors in the model (4) specified as follows:

$\Delta\mathrm{TQ}_t = (\phi-1)\Delta\mathrm{TQ}_{i,t-1} + \lambda_1\sum_{i=1}^{n}\Delta\mathrm{ERM}_{it} + \lambda_2\sum_{i=1}^{n}\Delta\mathrm{SIZE}_{it} + \lambda_3\sum_{i=1}^{n}\Delta\mathrm{LF}_{it} + \lambda_4\sum_{i=1}^{n}\Delta\mathrm{SG}_{it} + \lambda_5\sum_{i=1}^{n}\Delta\mathrm{DIV}_{it} + \lambda_6\sum_{i=1}^{n}\Delta\mathrm{AO}_{it} + \lambda_7\sum_{i=1}^{n}\Delta\mathrm{FS}_{it} + \lambda_8\sum_{i=1}^{n}\Delta\mathrm{EBIT}_{it} + \lambda_9\sum_{i=1}^{n}\Delta\mathrm{IDIV}_{it} + \lambda_{10}\sum_{i=1}^{n}\Delta\mathrm{SG}_{it} + \lambda_{11}\sum_{i=1}^{n}\Delta\mathrm{ROA}_{it} + \lambda_{12}\sum_{i=1}^{n}\Delta\mathrm{BETA}_{it} + \lambda_{13}\sum_{i=1}^{n}\Delta Dummy_{it} + \Delta\mu_{i,t}$ ……(4)

Where:

- TQ = Tobin's Q = the proxy for firm value. Tobin's Q = the summation of the market value of equity plus the book value of liabilities divided by the book value of assets.
- Integrated risk management (ERM) = a dummy variable indicating a binary decision for a 1, if a company has adopted an ERM programme and a zero if otherwise. Alternatively,

  $ERMi_t = \begin{cases} 1 \; if \; ERMi_t > 0 \\ 0 \; otherwise \end{cases}$

- SIZE = the natural logarithm of the book value of total assets.
- LF = the leverage factor, calculated as the ratio of the book value of liabilities to the book value of assets.
- SG = the sales growth which is measured as the historical (one-year) sales growth.
- ROA = return on assets = the ratio of net income to total assets = profitability.
- beta, *BETA* = the standard measure of volatility of the company stock in relation to the market.
- Dividends, *DIV* = a dummy variable that takes the value 1 if the company paid dividends during the corresponding year of analysis, and 0 if otherwise.
- FS (financial slack) = ratio of the summation of cash, cash equivalents and short term marketable securities to the book value of assets.
- AO (assets opacity) = ratio of intangible assets to the book value of assets.
- EBIT = earnings before interest and taxes.
- IDIV = international diversification = a dummy variable indicating a binary decision for a 1 if a company is engaged in international diversification and a zero if otherwise.

3.5 Discussion of variables of the study

In this study, Tobin's Q is used as one of the regressants, and a set of explanatory variables, including, ERM, size, financial slack, growth opportunities, and profitability, are also utilised. Tobin's Q is defined as the total of the company's equity market value plus total liabilities at book value, divided by total company assets at book value (Kommunuri et al., 2016). Tobin's Q is widely preferred to other measures because it can indicate the long-term potential of a company and shows the future requirements of financial analysts and share owners (Hoyt and Liebenberg, 2011; Kommunuri et al., 2016). The Q ratio is also deemed an objective measure of value that controls for the bias associated with company agency conflicts.

The Q ratio also supports the notion that ERM is not an investment which produces quick overnight benefits. The benefits and therefore value of integrated risk management takes time to materialise and require substantial human, financial and technical resources within the context of the operating environment. Lindenberg and

Ross (1981) add that Tobin's Q works well with variables that are associated with the medium to long-term horizons. ERM value to companies may start to accrue significantly after a reasonable period, such as after one year of full-scale implementation (Hoyt and Liebenberg, 2011).

ERM is described as a dummy variable, indicating a 1 if the company instituted an integrated approach to risk management (from a specific year onwards) and a zero, if no ERM programme is in place. The binary decision to use or not to use ERM was similarly employed by several scholars who conducted related studies on the value effects of integrated risk management on firm value.

ERM is associated with highly regulated industries, such as the financial, healthcare and the energy areas. This is because the risks inherent in these sectors are critical and catastrophic should they extensively happen at a point in time (Pagach & Warr 2010; Segal, 2011). These heavily scrutinised industries have the automatic advantage of enhancing their strategic, tactical and operational efficiency to create and sustain value. ERM has been tested and found to improve revenue and cost efficiencies in the Grace et al., (2015) empirical study. The nexus between integrated risk management and company value is therefore still empirically unclear. Some scholars only identify significant benefits from integrated risk management from banks and other highly regulated areas, for example Beasley et al., (2008). Other scholars like McShane et al., (2011) found integrated risk management to be highly and directly correlated to company value in organisations characterised by insufficient ERM ratings. This study interestingly, found no substantial findings of a direct association between integrated risk management and company value in organisations characterised by very good ERM ratings. Researchers have attempted to unlock the true value that integrated risk management brings to a company.

The results of Gordon et al., (2009) and Baxter et al., (2012) substantiate that integrated risk management, if well-crafted and implemented effectively, has a direct beneficial impact on company value. A classic epitome of the value effects of integrated risk management is the Hoyt and Liebenberg (2011) study which reported that integrated risk management premium on company value amounted to about seventeen percent.

This represents a compelling business case for non-ERM users to consider implementing integrated risk management to manage the firm's complex portfolio of risks. However, Abdullah et al., (2017) found integrated risk management to be inversely related to company value. The results highlighted that the benefits of ERM can take extended periods to be realised.

Other variables are also discussed, that are related to studies in the literature, which affect firm value. The natural log of company assets is used extensively in the literature to indicate the magnitude or size (SIZE) of a company. Many empirical studies reflect that larger companies are more inclined to institute integrated risk management (Hoyt and Liebenberg, 2011; Razali and Tahir (2012); Gatzert and Martin, 2015; Grace et al., 2015; Kommunuri et al., 2016, Abdullah et al., 2017). On the other hand, some results reflect an inverse nexus between institutional size and company value, pointing to an inconclusive picture, for example Lang and Stulz (1994) and Allayannis and Weston (2001). Empirical research studies state that relatively larger companies are exposed to a myriad of sophisticated risk portfolios and hence are obliged to consider control frameworks such as integrated risk management, which are designed to create, protect and sustain shareholder value. ERM is the obvious culmination of the metamorphosis of TRM and a natural choice for a firm to demonstrate to investors that the company espouses well-developed measures for corporate and financial governance. Naturally, the exorbitant initial setup costs of an ERM programme may only be technically justifiable in a relatively large company, simply because such firms can afford the amount of capital outlay involved.

This study corrects for the undesirable effects from capital structure implications by including financial leverage (LF), as part of the regressors. Leverage is computed as the total of liabilities over the total of assets, in line with other scholars and similar studies. The predicted sign between LF and the Q ratio is also unclear. LF rationalises available cash reserves which otherwise might be sub-optimally utilised by self-aligned executives who are affected by the agency theory and moral hazard. Conversely, a lot of debt amplifies the propensity and chance for financial distress and bankruptcy.

Within similar contexts, firms that have implemented integrated risk management, may minimise financial leverage through effective rationalisation of resources and as a result, substantially curb the chance for bankruptcy or risk financial distress. On the other hand, ERM firms may view the presence of an ERM programme as an effective control and an enablement to assume higher financial leverage because the CRO is in a position to effect risk disclosures and transparency through appropriate risk response and treatments (Pagach and Warr, 2010). This can be a compelling case for why firms may justify unusually higher than normal leverage levels (debt to equity proportions), as highlighted by Hoyt and Liebenberg (2011).

To correct for company profitability, this study follows the Allayannis and Weston (2001) study, who employed return on assets (ROA). ROA is computed as net income over total assets of the business. The predicted sign is a direct association between ROA and company value. This is because profitability is known to directly influence firm value through enhanced earnings. Similarly, the higher the profitability, the higher the value of a firm.

To correct for changes in growth aspects of firms, sales growth (SG) was employed. The increase in sales figures directly reflects the growth in firms, if revenues are significantly more than costs, all other factors held constant. The proxy for this variable is calculated as the percentage difference between yearly sales figures. SG was also used in the classic Myers (1977) study on variables that influence company value. The SG variable have the capacity to significantly affect firm value. This is typically reflected by the abnormal sales growth figures during the US subprime mortgage crisis of 2008 experienced due to lax risk management controls..

The effects of dividend policy on company value is controlled by dividend (DIV). This is a dummy variable that represents 1 if a company distributed dividends, and 0 if no pay outs were made to shareholders. The predicted sign of the correlation between DIV and company value is also inconclusive. The payment of cash to shareholders may indicate poor investment prospects and lack of business clout or acumen for the company which dampens investor confidence. On the contrary, cash outflows in the form of dividends may be deemed as a picture of financial health.

The risk of the unobserved volatility of the share price with respect to the market is corrected by beta (BETA). The predicted sign is a direct association between beta and company value, since higher returns on the market are associated with frequent changes or instability on the share price.

The proportion of intangible assets to total assets is also included in this study as part of the regressors, as employed by the Pagach and Warr (2010) study. This ratio is called assets opacity. Relatively companies that are more opaque have high amounts of intangible assets in proportion to the total asset base. This may represent a risk should the company consider potential merger and acquisition investment projects, or is winding up operations. More opaque firms are difficult to value, and financial analysts and potential investors may find it difficult to come up with fair financial figures for the business. In case of a bankruptcy, the shareholders could lose out because the business could be sold at a lower than usual price. Therefore, companies that are more opaque are generally expected to implement integrated risk management to control this risk, as reported by Hoyt and Liebenberg (2011). A holistic approach to risk management may enhance risk disclosures and culminate in better Q ratios.

Cash reserves are essential in maintaining healthy liquidity levels in a company. The company must be able to settle its working capital commitments as they fall due. Financial slack is part of the regressors in this study to correct for liquidity variations and conditions. It is computed as the proportion of cash, cash equivalents and financial assets held for trading divided by the company's total asset base. Empirical studies state that the findings on the impact of financial slack on Tobin's Q are mixed. Higher cash reserves could cushion firms in periods of financial turmoil, and reduce defaults on financial commitments, as suggested in the Pagach and Warr (2010) empirical evidence. Conversely, the institutionalisation and embedment of an effective ERM framework across a company may be the reason why a firm could maintain relatively lower levels of slack.

The nexus between integrated risk management and company earnings volatility (earnings before interest and taxes – EBIT) is inconclusive. It could be expected that effective ERM substantially results in stable earnings capacity sustained over long

periods of time. Similarly, the implementation of a holistic approach to the management of enterprise risks may minimise unusual variations in share price movements or behaviour and could indicate a favourable picture to prospective shareholders (Pagach and Warr, 2010).

Finally, to control for the effects of firms operating in globally diverse operational contexts, international diversification (IDIV) is employed, in line with the Pagach and Warr (2010) study. It is widely accepted that diversified companies are able to control the risk of operating in a single market or geographic context. Extensively diversified companies are in effect significantly exposed to a myriad of risks as a result of operating in technically sophisticated and distinctive markets. Deductively, the more a firm is diversified, the more extensive and sophisticated the risks to which it is exposed. This study expects, therefore, in line with the Golshan and Rasid (2012) empirical evidence, that there exists a direct correlation between a holistic approach to risk management and the company's diversification level. This study follows the Hoyt and Liebenberg (2008; 2011) studies whereby, IDIV, is a dummy variable, depicted by a binary figure 1, if the company is involved in global or international sales or transactions and zero if otherwise.

3.6 DATA

The population consists of all firms on the JSE. The sample is obtained by stratified random sampling from all the categories on the bourse. Simple random sampling is used to further select firms from each stratum or industry. A total of 45 firms formed the sample for this study. Data is availed from published and audited annual reports of listed companies, the JSE, South African Reserve Bank (SARB), and the iress INETBFA database. The data used in the study is for the period 2000Q1- 2016Q4.

A time series overview is used to determine any trends and relationships between the variables. Correlation analyses are also employed to determine the strength and direction of the relationships between the variables. Multivariate regression analysis is utilised to analyse the nexus between integrated risk management (ERM) and company (performance and value) since the study can then conveniently estimate the

magnitude and degree of correlational impact amongst the variables under investigation (Beasley et al., 2005a).

The models have no sign of serial correlation or heteroscedasticity as well as issues of endogeneity (Verma, 2007). The model passes the test of functional form and normality. The software package, STATA was used for data analysis. Descriptive statistics are used to depict major highlights in the dataset. Univariate and bivariate statistics were calculated to further examine and test the data sets for any relationships, multicollinearity, heteroscedasticity, any sign of endogeneity and heterogeneity. This helps to gain an overview of the characteristics of the data set. Inferential statistics were used to test the postulated hypotheses for the study.

3.7 Data Analysis

To determine the impact and relationship between ERM and firm value, multivariate regression models are used to examine the nature and pattern of relationships between the variables. Time series analysis was used to analyse trends and underlying patterns in the data. Correlation analysis was used to examine the nature of relationships between the variables. STATA software was used to run the data and produce results for analysis and discussion.

3.8 Summary

Chapter 3 gave an overview and detailed account regarding how the research was be conducted with respect to the type of data employed, multivariate regression analysis and the software that is employed to run the data to produce financial econometric output for subsequent discussion and analysis. The next section of this study (Chapter 4) discusses the findings of the study.

CHAPTER 4

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

In this part of the study, the findings of the research are discussed in detail. Various methods were employed to decode the correlations between the regressants and the regressors. A detailed account of the degree and direction of association amongst the research variables is presented, through a collection of tools and techniques. These methods are descriptive statistics, time-series overview, correlation analysis, and multivariate regression analysis. Specifically, the value effects of integrated risk management on company value are presented. The association between integrated risk management (ERM) and company financial performance (and value) is also discussed.

4.2 Overview of Descriptive Statistics

The data for this study was drawn mainly from the iress INETBFA database, as well as from integrated annual reports obtained from the JSE website, and from utilising search engines. All variables were obtained from the INETBFA database, except for the dummy variables, ERM, IDIV and DIV that were obtained from JSE websites and search engine manipulation. The data sources used in this study are relatively, reliable, more convenient, quality assured and audited. Stratified and simple random sampling were used to select companies in various industries from the JSE. A total of 45 companies were selected for the sample. Table 4.1 reports the accumulated number of ERM firms from the year 2000 to the year 2016. ERM adoption is defined as commencing in the beginning (first) year of detecting ERM activity in a firm, through keyword searches in audited published integrated annual reports, corporate governance statements, and using search engines.

Table 4.1: Sample Firms and ERM Adoption

Year	ERM firms	Total firms	% ERM firms
2000	3	45	6,67%
2001	5	45	11,11%
2002	7	45	15,56%
2003	11	45	24,44%
2004	17	45	37,78%
2005	20	45	44,44%
2006	21	45	46,67%
2007	25	45	55,56%
2008	28	45	62,22%
2009	30	45	66,67%
2010	35	45	77,78%
2011	36	45	80,00%
2012	35	45	77,78%
2013	38	45	84,44%
2014	43	45	95,56%
2015	45	45	100,00%
2016	45	45	100,00%

Adopted from audited integrated reports of sample firms from the JSE.

Author's own compilation

Table 4.3 shows that the number of ERM firms on the JSE increased significantly from 2000 to 2016. This could be due to various factors. The reasons could be the pressure to meet the requirements of the King Report for South Africa, JSE Listing Requirements, Companies Act, Treasury Regulations and the Public Finance Management Act (PFMA). The lessons from the 2007 to 2009 global financial crisis is also a contributory factor.

The drive to implement integrated risk management has been rising. The Hoyt and Liebenberg (2008; 2011) studies, which support findings in Table 4.3 and Figure 4.1, suggest that this increasing interest was due to factors such as research centres and specialised advisory companies focussing more on the ERM research agenda, and the incorporation of ERM into ratings methodologies of risk-affiliated consultancies.

The increasing trend towards ERM by companies worldwide is a culmination of several contributory reasons. The increasing number, intensity, velocity and sophistication of risk portfolios account for this trend. Moreover, evolutionary trends in various industries such as mergers and acquisitions, business process re-engineering, the knowledge economy and privatisation further unravel the mounting push for more advanced risk management standards (Pagach and Warr, 2010). Moody's Analytics, S&P, Fitch and other rating consultancies globally, have embraced ERM as part of their overall credit risk gauging formulae. This trend highlights and underscores the notion that governance, strategy, risk and performance dynamics are inextricably intertwined (King IV Report, 2016).

A well-functioning integrated risk management protocol is pivotal to the long-term viability of companies (Hoyt and Liebenberg, 2011). In value terms, as Segal (2011) contends, integrated value-based risk management is implemented to ensure the creation, protection and sustenance of shareholder value. Segal (2011) further adds that ERM proliferation is exacerbated by advancements in computer science, financial innovation, economic developments and more sophisticated financial and risk engineering techniques. Latest thinking reflects that a holistic approach to risk management enables companies to perform better, cut costs, increase revenues, post superior returns and outclass non-ERM users (Beasley, Clune and Hermanson, 2005a; Segal, 2011; Gatzert and Martin, 2015; Grace et al., 2015). This in turn can improve firm performance and shareholder value creation and protection.

Figure 4.1, below, indicates the increasing momentum in ERM adoption by sample firms since the year 2000, which may be attributed to reasons from empirical studies highlighted above. A study by Deloitte (2011), reported that only 52% of the companies in the financial sector had an integrated risk management plan by 2010. The report also indicated that compared with 2008, this constituted an increase of 52%.

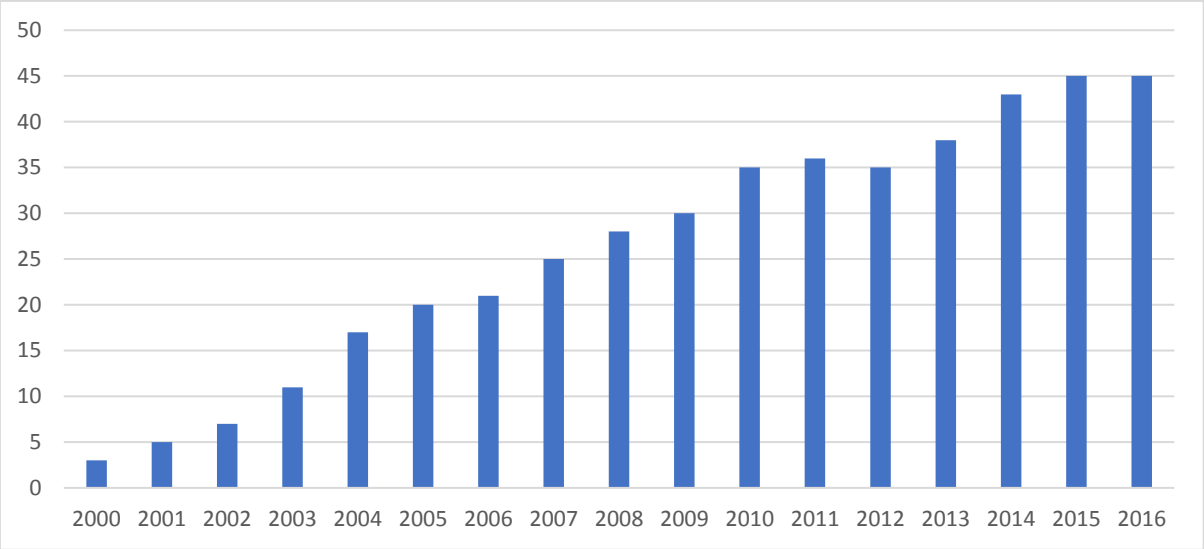

Figure 4.1: Accumulated Number of Sample Firms Implementing ERM by Year.

Source: Author's computation (Data from integrated reports of sample firms)

Figure 4.1 shows the time series activities of ERM adoption for the sample firms in this study. We hand-collected information on various aspects from different data sources, including integrated annual reports, and utilisation of search engines at each firm-year then used this information to create an ERM indicator to identify the beginning year of ERM adoption. Once we detect a firm's initial year of ERM activity, the following year is regarded as ERM adoption as well.

Table 4.2: An overview of descriptive statistics

Variable	Observations	Average	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
ERM	663	0.6651584	0.4722914	0	1	-0.70	1.49
Size	663	16.0116	2.265708	8.964568	21.40603	-0.01	3.30
Leverage factor (%)	663	0.93749	30.72307	-485.71	442.09	-0.31	171.30
Sales growth (%)	663	37.87668	856.3275	-1	21972.71	25.42	651.31
Return on Assets (%)	663	12.8842	15.17682	-97.39	131.38	0.57	14.92
Dividends (%)	663	0.9773756	0.1488152	0	1	-6.42	42.22
Beta	663	0.7604256	0.4159057	-0.1188	1.7999	0.73	3.16
Assets Opacity (%)	663	0.0822601	0.3345042	-0.0613431	5.996036	14.56	244.67
EBIT	663	879384.3	6617840	-3.16e + 07	5.42e + 07	2.42	24.10
Financial Slack (%)	663	0.6466877	3.436052	0.0001265	86.03938	23.42	578.01
International Diversification	663	0.8853695	0.318816	0	1	-2.42	6.85
Tobin's Q	663	1.750271	1.608068	-0.99	14.87	3.16	17.73

Adopted from data accessed from iress INET BFA database, 2017)

Table 4.2 displays a summary of statistics for sample companies who instituted integrated risk management, showing figures for the dependent and explanatory variables. The average financial performance indicated by ROA is 12.88%. The maximum ROA value is 131.38 and the minimum is -97.39, indicating that many firms are loss-making firms. However, the loss may not be attributed to adoption of an ERM system. Loss-making companies may lack adequate financial resources required to implement an ERM protocol. The use of Tobin's Q produces reliable results because it is rarely subject to managerial manipulation (Lindenberg and Ross, 1981).

Skewness calculates the symmetry in a probability density function. A skewness value of zero means the distribution is a smooth, bell-shaped symmetric distribution equating to a normal (distribution) curve, with a total area under the curve equal to one (Wegner, 2016). A large positive skewness value denotes that the function has a right tail, while a large skewness value means that the distribution has left tail (Wegner, 2016; Abedini, 2009). It can be deduced that since most variables have positive, relatively larger values, the distributions are right-tailed, meaning that these variables have a direct nexus and impact on the dependent variables in question (ROA and ERM).

Kurtosis computes the tail thickness of probability distributions (Abedini, 2009; Wegner, 2016). Generally, kurtosis relates to the nexus between the fourth central moment and the square of the second central moment, and thus the critical value is three. A normal curve has a kurtosis value of three. A kurtosis value greater than three means that the probability density function is short and leptokurtic in nature. Conversely, a value of less than three denotes a tall and platykurtic probability density function. Therefore, the table above shows leptokurtic characteristics.

A computed value of Tobin's Q of less than 1 means the company is engaged in wasteful and inefficient use of organisational resources. Conversely, a calculated Tobin's Q value of greater than 1 generally signals to the market that the company employs its resources in a productive and profitable manner (Kommunuri et al., 2016). The average value of Tobin's Q is +1.750, and it varies from -0.99 to 14.87. These empirical results confirm that most firms are concentrated at the lower end of the range. The average size of a company, computed as the natural logarithm of a company's total asset base, ranged from 8.96 to 21.41.

The average firm is highly levered at 93.75%. Empirical results on the determinants of ERM adoption (which include financial leverage, assets opacity, financial slack, size, international diversification, return on assets and growth opportunities) and the subsequent impact of integrated risk management company value and performance are ambiguous. For example, Hoyt and Liebenberg (2003) and Golshan and Rasid (2012) reported financial leverage as highly and directly correlated to integrated risk management.

A direct weak correlation was reported by Razali, Yazid, and Tahir (2011), between financial leverage and company value. This depicts a sharp contrast from the Hoyt and Liebenberg (2008; 2011) empirical evidence, which reflects a significant inverse correlation between financial leverage and integrated risk management. The presence of effectively embedded integrated risk management may account for why some companies have high leverage factors, because ERM safeguards firms from the threat of defaults on their obligations. If ERM is in place, a low leverage factor may encourage a company to assume more risks in the long-term horizon Hoyt and Liebenberg (2011).

According to Table 4.3, most companies carry some cash reserves, with the mean of liquid cash, cash equivalents, and financial assets held for trading being 64.67% of total assets. Pagach and Warr (2010) indicated that the evidence on the effect of financial slack on ERM is not unanimous. Some firms with an ERM system in place have to hold more cash in order to reduce their probability of default as opposed to limited levels of liquidity (working capital).

The mean size in the sample of companies has a total asset base of R8,9 billion, but the distribution of firm size is quite skewed. It is interesting to note that relatively larger companies (over R8.9 billion in total assets), in this study, adopted ERM earlier than relatively smaller companies in the sample. Similarly, industry and regulatory pressure may have contributed immensely to ERM adoption which may have positively enhanced firm value (Gatzert and Martin, 2015).

Gatzert and Martin (2015) empirically confirm the effect of the size of a company on the implementation of integrated risk management. Larger companies demand more resilient risk management systems to cope with the nature of risk management sophistication. Within similar contexts, highly diversified companies are more inclined to develop an ERM system to cope with complications associated with their risk portfolios. A strong direct positive correlation was reported in the Razali, Yazid and Tahir (2011) study.

This study reported that on average a company is moderately profitable at 12.88%, with a standard deviation of 15.18. Table 4.3 shows a strong correlation between ROA and the Q ratio. These findings are consistent with most empirical studies which expect a positive relationship between ROA and Tobin’s Q. Abdullah et al., (2017) contend

that stability in earnings and profitability is the primary objective of a company. This implies that better performing companies generate more revenue than costs. Financial analysts and investment bankers prefer profitable companies to loss making ones, since they have more potential for success and less probability for bankruptcy. Empirical evidence reported that there is a direct association between ROA and Tobin's Q, in line with findings of this study (Hoyt & Liebenberg, 2011; Tahir & Razali 2011; Kommunuri et al., 2016; Abdullah et al., 2017).

The firms in the sample have an average of 8% opaque assets with a standard deviation of 0.33. Liebenberg and Hoyt (2003) argue that companies that signal more opaque characteristics tend to gain substantially from an integrated risk management programme. Pottier and Sommer (2006) state that higher levels of opacity make the valuation of companies very challenging for prospective shareholders and the general investment community. Hence, a well-developed integrated risk management programme enhances risk disclosures and consequently, impinge a direct impact on the Q ratio.

4.3 Correlation analysis

Table 4.3: Pearson's Correlation Coefficient Matrix

Table 4.3 reports the correlation coefficient of the variables of the study. There are 663 firm year observations from 2000 to 2016.

	TQ	ERM	Size	LF	SG	ROA	DIV	Beta	AO	EBIT	FS	IDIV
TQ	1.0000											
ERM	0.1417	1.0000										
Size	-0.0970	0.3603*	1.0000									
LF	0.0270	-0.0252	-.0.1196*	1.0000								
SG	0.2165*	0.0255	-0.0378	0.0012	1.0000							
ROA	0.4055*	-0.0930	-0.2807*	0.0413	0.0476	1.0000						
DIV	-0.0301	0.1500*	-0.0586	-0.0033	0.0063	-0.1053*	1.0000					
Beta	0.1109*	0.1180*	0.3719*	0.0062	0.0996	-0.850	-0.2267*	1.0000				
AO	0.1377*	-0.0218	0.1548*	0.0105	-0.0104	0.1279*	0.0208	-0.0477	1.0000			
EBIT	0.1429*	-0.0218	-0.0827	0.0735	-0.0059	0.3419*	-0.1348*	0.1156*	0.0701	1.0000		
FS	-0.0410	-0.0742	-0.1875*	0.0095	-0.0078	0.0113	0.0135	-0.0545	0.6836*	-0.0108	1.0000	
IDIV	0.1379*	-0.0045	0.0863	0.0031	0.0144	0.0078	-0.0547	-0.1450*	-0.0051	-0.0087	0.0135	1.000

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Source: Author – own compilation.

Table 4.3 shows the Pearson correlation coefficients for ROA and Tobin's Q determinants. A few relationships warrant attention. A strong positive (negative) association is exhibited between Tobin's Q and sales growth, ROA, beta, assets opacity, EBIT and international diversification. The relationship between Tobin's Q and ERM is positive but not significant. This might be because the benefits of ERM may not be quickly realised, and can take a longer time to accrue.

There are generally high correlations between return on assets and some of the explanatory variables such as AO and DIV. The coefficients reported in the matrix above reflect general low levels of association between the variables, hence, multicollinearity has been effectively controlled in this empirical study. Multicollinearity results from high degrees of correlations among independent variables, which also affect model specification and lead to false inferences being drawn from the data.

4.4 Critical analysis of findings on multivariate regressions

Model validation included regressing the regressants, against the independent variables, and comparing them with how the equations performed with respect to the same regressors over the same period, in line with Baltagi (2008), Hoyt and Liebenberg (2011), and Marozva (2017). The Hausman's (1978) test was employed to determine and make a choice to utilise either the REM or the FEM. With $x^2calc = 84.61$, we fail to accept the null hypothesis, H_0, that the REM is correct. Therefore, the alternative hypothesis, H_1, is chosen, indicating that this study employed the fixed effects estimation model, as the most efficient and unbiased estimation model.

The degree of association between the regressors and the regressants is generally good as the stated regressants (ROA and Tobin's Q) together explain about 29% and 22% (R^2) of the variance in firm performance and firm value respectively (Tables 4.5 and 4.7). The model is statistically significant, as indicated in Table 4.5, showing that the complete set of regressors explains firm performance to a statistically significant degree. Accordingly, it can be inferred to the population represented by the sample of 663 firm-year observations in the regression equations.

The statistical validity and robustness tests were confirmed by running panel data estimation and employing a plethora of 5 techniques (Table 4.4 and 4.6). The analysis of the results is hinged on the FE, Least square dummy variable (LSDV) and two-step

system GMM empirical findings. In this study, the GMM is preferred to other methodologies, since it effectively corrects the equations for endogeneity problems among companies operating in the same sector or industry such as financial, healthcare and mining firms (Baum, Schaffer and Stillman, 2003). The risk of a scenario where the regressant is associated with the lagged regressant (Kiviet, Pleus, & Poldermans, 2017) is also controlled by the GMM system models (Roodman, 2006; Marozva, 2017). The findings of other estimation results are reported to augment our model robustness argument. The findings on the effect of ERM on ROA and Tobin's Q are indicated in Table 4.4 and Table 4.6, as well as in Tables 4.5 and 4.7 respectively.

In terms of the empirical estimation, the relationship between firm value (and performance) and the independent variables of firm-specific factors was expressed mathematically in equations 3 and 4, explicitly mentioned above, and the corresponding results were presented in Tables 4.4, and 4.6, and Tables 4.5 and 4.7 respectively, reflecting the diagnostic statistics. Table 4.4, below, depicts that there is an inverse association between ERM and ROA, across almost all models, except for the GMM model, which indicates a positive relationship (notably, FE = -0.239, Pooled = -1.82, GLS = -1.416*, and LSDV = -0.351).

Table 4.4: Dynamic panel-data estimations: ERM and ROA

	FE ROA	POOLED ROA	GLS ROA	LSDV ROA	GMM DIFF ROA	GMM SYSTEM ROA
ERM	-0,239	-1,82	-1.416*	-0,351	2,357	2,011
	(-0.13)	(-1.25)	(-2.54)	(-0.60)	-0,83	-0,41
SIZE	-1,434	-1.089***	-1.241***	-2.294***	-0,842	-1,421
	(-1.02)	(-3.89)	(-4.87)	(-5.83)	(-0.56)	(-0.80)
LF	0,00374	-0,00444	0,00167	0,00051	-0,00394	-0,00056
	-0,35	(-0.66)	-0,06	-0,11	(-1.17)	(-0.11)
SG	0,000402	-0,0004	-0,00031	0,00325	0.000661*	0,000651
	-1,88	(-1.30)	(-0.82)	-0,92	-2,09	-1,87
ROA						
DIV	-10,44	-8.949**	-9.653***	-9,073	-5,44	-15,68
	(-1.69)	(-2.65)	(-8.89)	(-1.49)	(-0.52)	(-0.93)
BETA	0	-4.175*	-4.019***		-31,8	
	(.)	(-2.16)	(-4.01)		(-1.83)	
AO	1,786	2,923	3.008***	0.293***	-0,68	-1,646
	-0,73	-1,7	-9,25	-7,34	(-0.29)	(-0.44)
EBIT	0.000000892**	0.000000621***	0.000000655***	0.000000442***	8,02E-07	8,52E-07
	-3,17	-5,49	-16,22	-5,91	-1,76	-0,63
FS	-0,175	-0,238	-0,222	-0,143	0,0147	0,0583
	(-0.94)	(-1.92)	(-1.10)	(-0.39)	-0,14	-0,28
IDIV	1,244	-2,238	-2.205***	-0,284	-6,654	1,214
	-0,83	(-1.27)	(-4.56)	(-0.10)	(-0.83)	-0,18

L.TQ						
TQ	2.849***	3.488***	3.433***	2.704***	4.315**	3,966
	-3,79	-4,74	-22,44	-5,79	-2,97	-0,73
L.ROA				0.289***		
				-8,55		
_cons	39,28	38.71***	41.31***		49,92	
	-1,85	-7,36	-12,54		-1,55	
N	663	663	663	624	663	624

Note: t – statistics are in parentheses.

***, ** and * = degree of significance at the 99%, 95% and 90% levels respectively.

_cons relates to the coefficients for the multivariate regression equations and their relationship to the variable being examined.

Source: Author's own compilation: multivariate regression outputs from the STATA software.

Table 4.5: Overview Diagnostic Report: ERM and ROA

	Ordinary Least Squares (OLS)	**General Least Squares (GLS)**	**Fixed Effects (FE)**	**Least Square Dummy Variable (LSDV)**	**2 step system Generalised Method of Moments (GMM)**
Firm Year Observations	663	663	663	663	663
Groups	39	39	39	39	39
Term	17	17	17	17	17
F statistic/ Wald x^2	3000.00	7610.76			24.41
Probability>F/Prob> Wald x^2	0.0000	0.0000	0.0000		0.0000
Hausman Test			84.61		
Probability >x^2		0.0000	0.0000		
Coefficient of Determination (R^2)					
Within		0.1973	0.1994		
Between		0.5157	0.4589		
Overall	***0.3090**	**0.3109**	****0.2895**		
rho		0.16685906	0.27513 555		
Arellano-Bond AR (1)					-1.92
Probability >z					0.055
Arellano-Bond AR (2)					0.32

Probability >z					0.749
Sargan test of overid					29.19
Probability >x^2					0.000
Hansen test of overid					7.96
Probability >x^2					0.241
Number of Instruments					18

Source: Author's own compilation: multivariate regression outputs from the STATA software

This relationship is notably, indicated as significant as per the GLS model, at the 0.9 level (GLS = -1.416*), which indicates that the association between the ERM and ROA is significantly inverse. The F-statistic and probability value (p-values) also confirm this relationship (Table 4.5). To examine the validity of the equation, the association between ROA and Tobin's Q was analysed. ROA was the regressant and size, leverage, assets opacity were included as some of the dependent variables in the equation. The equations were designed to determine the correlation between ROA and the independent variables. The results are presented in tables 4.4 and 4.5. F-statistics and (values of probabilities) were employed to determine the strength and direction of the association and the findings are indicated in Table 4.5.

The profitability measure, return on assets, was employed as a company performance measure, similar to related empirical studies (Li et al., 2014; Kommunuri et al., 2016; Marozva, 2017). Table 4.4 shows an inverse indirect correlation between integrated risk management and ROA. These findings are similar to the Kommunuri et al., (2016) study (across almost all models used). The evidence shows that in the short run, a company's investment in integrated risk management does not bear any fruits. It appears that initially, the risk management efforts and costs have no benefits at all for the firm. The fact that integrated risk management is not yet well-developed and advanced in emerging economies like South Africa as well as the exorbitant cost for an ERM investment may account for the inverse correlation findings (Beasley et al.,

2008; Tahir & Razali, 2011; McShane et al., 2011; Rochette 2009; Pagach & Warr 2010; Segal, 2011). Thus, the findings of the study confirm hypothesis one. Arguably, designing an integrated risk management system can be a costly exercise to many firms in South Africa, which results in negative effects on firm performance.

Table 4.6, extracted from model 4, in Chapter 3, indicates that there is a significant direct correlation between ERM and Tobin's Q, across almost all models (FE = 0.500**, Pooled = 0.644***, GLS = 0.590***, and LSDV = 0.188**), except for the GMM model, which exhibits a weak inverse relationship.

Table 4.6: Dynamic panel data estimations: ERM and Tobin's Q

	FE TQ	POOLED TQ	GLS TQ	LSDV TQ	GMM DIFF TQ	GMM SYSTEM TQ
ERM	0.500** -2,82	0.644*** -5,42	0.590*** -11,5	0.188** -2,9	-0,162 (-0.55)	-0,213 (-0.64)
SIZE	0,0649 -0,42	-0.103* (-2.47)	-0.102*** (-5.62)	-0.102* (-2.47)	0,473 -1,87	0.458* -2,24
LF	-0,0001 (-0.24)	-6,7E-05 (-0.11)	0.00119* -1,97	5,74E-05 -0,29	-0,00014 (-0.62)	-0,000249 (-1.38)
SG	0.000234*** -12,23	0.000314*** -11,71	0.000271** -3,23	-0,00019 (-0.79)	0.000454* -2,68	0,0000327 -0,79
ROA	0.0310* -2,07	0.0397*** -3,59	0.0327*** -18,38	0.0101*** -9,02	0,0029 -0,39	-0,000692 (-0.06)
DIV	-0,421 (-0.57)	0,203 -0,72	0,136 -0,51	0,0246 -0,06	-0,573 (-0.32)	-0,873 (-1.14)
BETA	0 (.)	0.736* -2,5	0.759*** -14,14		0,0786 -0,02	
AO	0,278 -1,83	1.071* -2,23	0.956*** -8,83	-0.0252*** (-10.94)	0.989** -2,99	0.346* -2,54
EBIT	-1,84E-08	-6,72E-09	-2,36E-09	7,88E-09	3,99E-08	2,30E-09

	(-1.09)	(-1.01)	(-0.45)	-1,32	-1,02	-0,33
FS	-0,0156	-0.0945**	-0.0800***	-0,00408	-0,0329	0,00485
	(-1.43)	(-2.87)	(-9.06)	(-0.16)	(-0.99)	-0,36
IDIV	0.588***	0.899***	0.930***	0,153	0,374	-0,0363
	-4,12	-6,28	-12,69	-1,07	-0,45	(-0.05)
L.TQ				0.883***		
				-53,39		
TQ						
L.ROA						
_cons	-0,134	0,867	0.988**		-5,762	
	(-0.06)	-1,4	-2,69		(-0.93)	
N	663	663	663	624	663	624

Note: t – statistics are in parentheses. ***, ** and * = degree of significance at the 99%, 95% and 90% respectively.

_cons relates to the coefficients for the multivariate regression equations and their relationship to the variable being examined.

Source: Author's own compilation: multivariate regression outputs from the STATA software

Table 4.7: Overview Diagnostic Report: ERM and TQ

	Ordinary Least Squares (OLS)	**Generalised Least Squares (GLS)**	**Fixed Effects (FE)**	**Least Square Dummy Variable (LSDV)**	**2 step system Generalised Method of Moments (GMM)**
Observations	663	663	663	663	663
Groups	39	39	39	39	39
Term	17	17	17	17	17
F statistic/ Wald x^2	123.65	42187.88			658.39
Probability >F statistic/ Probability > Wald x^2	0.0000	0.0000	0.0000		0.0000
Hausman Test			84.61		
Probability >x^2		0.0000	0.0000		0.0000
Coefficient of Determination (R^2)					
Within		0.1503	0.1575		
Between		0.5780	0.3556		
Overall	***0.3090**	**0.3025**	****0.2188**		
rho		**0.14181823**	**0.36110229**		
Arellano-Bond AR(1)					-0.05
Probability >z					0.957

Arellano-Bond AR(2)					-1.09
Probability >z					0.278
Sargan test of overid					463.36
Probability >x^2					0.000
Hansen test of overid					5.94
Probability >x^2					0.429
Number of Instruments					18

Source: Author's own compilation: multivariate regression outputs from the STATA software

The benefits of integrated risk management can drive scholars to delve deeper into the secrets of ERM to better understand how to unlock value from this new risk management paradigm.

The second regression model shows the ERM adoption effect on Tobin's Q. The model is statistically significant as described above, suggesting that the effect of integrated risk management on company value, as described by the regressors, is statistically significant. The degree of correlation between the regressant and the regressors is satisfactory, as the model explains 22% (R^2) of the variance in company value. A Lower R^2 may also present the fact that the market's perception of the importance of the stated independent variables can be inadequate. As to economic implications, the evidence shows that the market perceives ERM adoption (Tables 4.6 and 4.7) as a key tool for unlocking and sustaining value, and consequently safeguards the firm from adverse financial scenarios.

The results support prior evidence that firms' use of proper risk management strategies improves firm value (Hoyt and Liebenberg 2008). The findings confirm that in an emerging economy like South Africa with limited mandatory legal and regulatory requirements regarding ERM adoption, the market perceives firms' adoption of ERM as credible and value relevant. Overall, the results exhibit that ERM increases firm

value across various industries. In tandem with earlier studies, the results emphasise that the investor community decodes a company's implementation of integrated risk management as a favourable signal, indicating that ERM enhances firm value, and thus, the results of the study support hypothesis two.

Many scholars have explored both the qualitative and quantitative benefits that accrue to companies that implement integrated risk management. Global comparative empirical evidence from Gatzert and Martin (2015) states that a direct correlation between integrated risk management and company financial performance (and value) was reported in the entire range of findings. These results, however, were contingent upon peculiar situational factors on each study. A quantified financial value was reported in the Hoyt and Liebenberg (2008; 2011) studies that the contribution of integrated risk management to total company value was about seventeen to twenty percent. These findings came from the five studies that focussed on the benefit of integrated risk management with respect to overall company value. An interesting finding from McShane et al., (2011) showed a strong, direct association between advanced levels of silo-based TRM and the value of a firm. The study however, showed no improvement in shareholder wealth as a culmination of migrating from TRM to an integrated risk management landscape.

Furthermore, Beasley, Pagach, and Warr (2008), cited in Gatzert and Martin (2015), could not report any compelling evidence regarding the nexus between share price behaviour and the employment of a chief risk officer or head of an ERM programme in listed firms, with the exception of companies from non-financial sectors. This finding points to an inconclusive stance on the real value that companies obtain from instituting a holistic approach to risk management. This can add weight to sceptical company executives who view ERM with a negative, pessimistic lens to substantiate the view that ERM posits no strategic and tactical corporate value to firms who embrace it. Within the same context, Tahir and Razali (2011) noted a direct weak association regarding integrated risk management and company value.

The Grace et al., (2015) empirical evidence noted a strong, direct correlation pertaining to the impact of integrated risk management on the cost structure and revenue characteristics of sampled companies. This implies that integrated risk management's benefits can be financially quantified to account for its usefulness in value terms.

Specifically, the presence of an ERM executive and/or board level committee has a favourable significant influence on a company's cost management enhancements. The employment of ERM, according to the evidence in the aforementioned study, results in the use of more advanced risk-based modelling which improves the operational effectiveness and efficiency in companies.

The Gordon et al., (2009) study reported a direct strong correlation between integrated risk management and company performance, using twelve-month abnormal share price returns. The evidence was however, dependent on several company related exigencies and contingencies. In similar empirical findings, Pagach and Warr (2010) report a moderate correlation regarding the effect of a CRO appointment on the behaviour of shares for sampled companies. The reflected limited evidence on reduced stock volatility was a culmination of ERM deployment. These mixed empirical findings are incessantly driving the interest of ERM globally by scholars in different economic and financial contexts.

The contextualised underpinnings regarding the mode of research employed by scholars have a bearing on the resultant research evidence promulgated thereof. This was epitomised by the Gatzert and Martin (2015) evidence, which reports that a substantial reduction in earnings volatility as well the posting of above average share price returns was recorded on the date when the head of an ERM programme was formally employed. The sample was restricted to firms that have higher than normal single-day share price returns after CRO employment. Other cumulative effects following CRO employment include more financial leverage and improved return on equity metrics. Firms that have formalised integrated risk management into their strategic, tactical and operational ethos, can benefit from improved risk management information flows and transparency, thereby, curtailing substantial business uncertainty and fostering cost reduction and profitability enhancements.

Proponents of integrated risk management contend that the value of an ERM programme is explicitly clear if the investment is well managed and embedded (Hoyt and Liebenberg, 2011). ERM companies benefit from synergistic arrangements in responding to risk across corporate multi-functional project lines, curb duplication of risk response efforts and amplifies resource rationalisation. Risk interconnectedness and complexities are effectively managed by orchestrating a well-crafted risk portfolio

that enables a holistic response to the management enterprise risks. The firm can be able to directly take advantage of approved opportunities in the operating environment (Hoyt and Liebenberg, 2011).

The chance of credit risk defaults and bankruptcy is decreased through improved financial management. Better risk management disclosures help to provide the investor community with an improved view of the riskiness of a company, thus, improving corporate governance and image in companies. The risk of regulatory scrutiny and fines is also reduced owing to advancements in risk management (Gordon et al., 2009; Pagach and Warr, 2010).

A key proposition from the Gatzert and Martin (2015) study is that it is difficult to gauge and compare empirical evidence from a plethora of related studies on ERM. This is because different studies employ significantly distinct risk research methodologies which has a major bearing on the comparability of the evidence in question. For example, a study might use one methodology while a related study may employ a collection of research methodologies to augment the study. In addition, some studies may use substantially different methods to achieve research objectives. All these factors technically impinge on the ability to compare similar studies and infer reasonable and meaningful conclusions. Technical considerations relating to the type of estimation employed, the technique employed for integrated risk management and the ways in which the value (and performance) of a company is measured (for instance, Tobin's Q, ROA, ROE, among other measures). Other complications relate to the data type, sector from which the firm comes from and the term chosen for analysis.

Some studies may have been significantly motivated by unusual developments in the global financial markets, such as the financial crisis of 2007 to 2009. Such studies may be affected by these unusual implications, which therefore limit comparability amongst similar studies. The classic Gatzert and Martin (2015) evidence reiterates that integrated risk management has a significant direct (positive) effect on the performance and value of companies from a global context. Furthermore, integrated risk management computes a portfolio view of the risk behaviour of a company, augments the effectiveness and efficiency of the risk assessment architectural capabilities and enhances the quality of decisions made at every level of the business

(Meulbroek, 2002; Nocco and Stulz, 2006; Pagach and Warr, 2010; Hoyt and Liebenberg, 2011, Gatzert and Martin, 2015).

Moreover, TRM concentrates on safeguarding the firm from negative, bad financial situations. ERM, on the other hand, focusses on the handling of risk through the synchronisation of ERM into both strategic and tactical operations of the business which improves investor value. ERM, as opposed to TRM address both downside and upside (opportunity management) thereby ensuring balanced risk-return management (Segal, 2011). Furthermore, the employment of the head of the ERM programme is designed to diminish intelligence asymmetries and lubricates the risk information flow to the board, its committees and throughout the organisation, which enhances the image of the firm before the investor community. This helps to reduce information asymmetry across various stakeholders of the firm, including company representatives and shareholders (Gatzert and Martin, 2015).

It is empirically indicated that heavily scrutinised sectors such as financial, energy and health care areas are more inclined to institute integrated risk management than less regulated ones (Segal, 2011). This automatically indicates that the highly monitored firms have superior levels of governance and risk management standards. Some scholars assert that the degree of correlation between integrated risk management and corporate performance and value is positive and significant (Hoyt and Liebenberg, 2011; Grace et al., 2015), other studies (for example, Beasley et al., (2008)) contend that such strong relationships are characteristic of industries with higher governance standards, for instance, the banking industry. This makes the value-based debate highly complex as different scholars using different methodologies, in different contexts endeavour to compare their empirical findings.

Firms with an immature integrated risk management programme, espousing unfavourable risk management ratings (from Moody's Analytics, S&P and Fitch) seem to have a direct correlation between ERM and company value (McShane et al., 2011; Baxter et al., 2012). This study could not find or decipher, any direct strong correlation in companies endowed with superior ratings from credit rating agencies. Integrated risk management was found to be highly associated with company value, in select studies which emphasised the magnitude of a company and the level of sophistication (Hoyt, Moore and Liebenberg, 2006; Gordon et al., 2009). The Hoyt and Liebenberg (2008)

evidence explicitly reflected an ERM value contribution of seventeen percent in proportion to overall company value.

According to Abdullah, Janor, Hamid and Yatim (2017), different assumptions account for the contemporary wave of ERM proliferation. The ERM irrelevance propositions of corporate finance (Markowitz 1952; Modigliani & Miller 1958; Sharpe 1964), stipulate that naturally investors do not acquire risk management expertise to mitigate undesirable risk scenarios. Advocates of integrated risk management propound that ERM ameliorates company value, provided variables such as effective cost management and profitability improvements are sustained (Meulbroek 2002; Nocco & Stulz 2006).

Although empirical literature on ERM is growing rapidly across the world as reflected by many studies on the subject, there still remains a collection of studies that contend that integrated risk management offers no meaningful contribution to company value. Researchers such as Lin, Wen and Yu (2012) and Abdullah et al., (2017) argue that there is an empirically inverse association between integrated risk management and overall company value. Moreover, Tahir and Razali (2011) report virtually a zero correlation regarding the effect of integrated risk management on the value of a company. These empirical pronouncements align with the Manab, Kassim & Hussin (2010) study which report that the primary prerogative of companies instituting ERM is related to the ability of withstanding adverse financial scenarios as opposed to the creation, protection and sustenance of value. The explicitly distinct findings account for different techniques employed, varying sample sizes and the circumstances recorded before, during and after the study (Abdullah et al., 2017).

There is empirical evidence that integrated risk management can technically erode company value. It was reported in the Lin et al., (2012) study that integrated risk management has five percent erosional impact on market value, and four percent damage on return on assets. The reasons for the negative impact could be due to the exorbitant investment costs and a lack of ERM requisite know-how. If ERM is deployed ineffectively, it can become a costly burden, rather than a benefit to companies (Fraser, Schoening-Thiessen and Simkins, 2008).

The regressors in this study, size, sales growth, ROA, BETA, assets opacity, international diversification and partly financial slack had a strong impact on firm value as measured by the Q ratio. ROA and BETA have a direct influence, meaning that probably highly unstable firms are potential candidates for superior returns. Gatzert and Martin (2015) postulated hypotheses for different independent variables impacting firm value, specifying that companies are more likely to institute integrated risk management with increasing firm size, financial leverage, earnings and/or cash volatility, share price volatility, assets opacity, growth opportunities and diversification.

Table 4.6 also shows that there is a direct correlation between size and firm value. This association is strong under the two-step GMM system estimation model. The average-sized firm has a book value of total assets of R8,9 billion, but the distribution of firm size exhibits moderate skewness. It is interesting to note that relatively larger companies (over R8.9 billion in total assets), in this study, adopted ERM earlier than relatively smaller companies in the sample. Similarly, industry and regulatory pressure may have contributed immensely to ERM adoption, which may then positively enhance firm value (Gatzert and Martin, 2015).

Firm size's influence as a determinant of integrated risk management is reported in many studies. The impact is very strong, at the ninety-nine percent level in the Hoyt and Liebenberg (2011) evidence. It therefore implies that relatively large companies are more inclined to use integrated risk management because they are exposed to many forms of risk events, which demand sophisticated and expensive solutions. Beasley et al., (2005b) add that evidence suggests that larger companies have a higher likelihood of implementing a holistic approach to risk management.

Evidence in Table 4.6 reports a mostly inverse correlation between the leverage factor and the Q ratio, in line with the McShane et al., (2011) study. The empirical results from the literature are however, inconclusive. Leverage is the magnitude of debt assumed in the process of procuring the asset base of the business (Lin et al., 2014). It comprises the total liabilities the firm has in relation to total assets. Firms can decide to borrow more cash and increase their financial leverage, in order to have access to more liquidity. Companies use debt finance to add more investments to their balance sheets which minimises the utilisation of free cash into unprofitable ventures and other agency theory related problems (Jensen 1986). Assuming more debt can imply that

the company enjoys lower tax rates. When a firm borrows a substantially large amount from financial institutions, such lenders may require the borrower to demonstrate that they have an integrated risk management system in place to protect their business from adverse financial scenarios, in line with Lin et al., (2014).

Capital providers are likely to raise red flags when a borrower's liabilities are increasing at unsustainable rates, which lead to higher levels of financial leverage. Conversely, some companies may decide to have low leverage factors which help to cushion them in periods of unprecedented financial or economic crises (Hoyt and Liebenberg, 2011). Companies, with a higher risk appetite may assume higher risk projects because the firm has an integrated risk management programme in place, which controls potential negative exigencies on the balance sheet. The correlation between integrated risk management and leverage is blurred and unclear (Hoyt and Liebenberg, 2011). At higher levels of financial leverage, a company may decide to establish an ERM function headed by a risk executive to curb the chance of financial distress or bankruptcy. It is significantly risky to have long periods of time when a firm uses its debt base to pay-off its financial obligations. The CRO is hence employed to sensitise and warn executives of imminent precarious conditions should they materialise or deem to materialise, relating liquidity risk and working capital management.

Some studies utilise the debt to equity ratio to compute a company's leverage factor. The advantage of incorporating some debt into a firm's capital structure (mix) is that it mitigates moral hazard and agency problems whereby hired managers (stewards), non-owners of the business can misuse business assets for their own selfish objectives such as empire building or accentuating their performance bonusses (Jensen, 1986). Incessant loss making makes firms susceptible to adverse rulings by credit rating agencies (McShane et al., 2011). An inverse correlation between integrated risk management and company value was reported by the Lin et al., (2012) study. Before the advent of integrated risk management, Allayannis and Weston (2001) indicated an inverse association regarding the impact of leverage on the corrected Q ratio.

The results in Table 4.6 indicate that there is a significant direct association between sales growth and the value of a company (Tobin's Q). This result aligns with related empirical studies that sales growth is directly associated with company value. Scholars like Myers (1977) have stated that the sales variable is one of the key factors that

influence the value of a company. Abnormal and unsustainable sales growth rates by banking firms to their clients during the financial crisis involving the US subprime mortgage crisis of 2007 to 2009 is seen as a significant failure of the fundamental notions of risk management. Maury (2006) and King and Santor (2008) indicated that growth opportunities as measured by sales growth has a direct correlation with the performance of a company.

Results of this study, in Table 4.6 showed a significant and direct association between assets opacity and the value of the company (as indicated by Tobin's Q), across almost all equations employed in the study, except for FE which shows a weak positive relationship (FE = 0.278, Pooled = 1.071*, GLS = 0.956***, LSDV = 0.0252***, GMM-DIFF = 0.989** and GMM-SYS = 0.346*). Empirical evidence indicates that companies with significant levels of intangible assets in relation to the total asset base stand to substantially gain more from instituting an integrated risk management programme. Hoyt and Liebenberg (2011) contend highly opaque companies may be valued incorrectly because it is difficult to evaluate intangible assets, and firms that establish an integrated risk management protocol can benefit significantly due to enhanced risk disclosures. When a company intends to divest, wind up or sell some of its non-performing asset base, Pottier and Sommer (2006) add that in times of economic slowdown and financial crises an effective integrated risk management can protect the firm from the risk information asymmetry which may affect the value of the firm adversely. The owners of the firm may end up losing a significant amount of money because non-physical assets may be incorrectly valued or priced resulting in a lower than normal valuation (Pagach and Warr, 2010).

A positive (negative) result is exhibited between dividends and Tobin's Q (FE = -0.421, , Pooled = 0.203, GLS = 0.136, LSDV = 0.0246, GMM-DIFF = -0.573, and GMM-SYS = -0.873). Those findings are similar to prior studies. For example, Hoyt and Liebenberg (2011), state that the predicted sign is unclear and may be positive (direct) or negative (indirect or inverse).

Sometimes investors may perceive a dividend pay-out of money as an indication that the company has exhausted all value adding initiatives and thus starved off all its investment project opportunities. This paints a gloomy picture that the firm may not enhance shareholder value. When investors assume this perception, the value of a

company is significantly eroded. Conversely, risk averse investors who expeditiously track the value of their portfolio, welcome the strategic decision to declare no dividends, as an indication that the firm is effectively managing and controlling the agency problem and moral hazard. Declaring no dividends could be a sign that the firm is ploughing back all profits into the business, and may thus attract more investors to demand more of the firm's shares and investment projects.

A strong direct association is exhibited between international diversification and the value of a company as measured by Tobin's Q, on nearly all equations, except under GMM (FE = 0.588***, Pooled = 0.899***, GLS = 0.930***, LSDV = 0.153, GMM-DIFF = 0.374, and GMM-SYS = -0.0363). According to Standard & Poor's (2005), companies that are more sophisticated have a higher probability to gain more from investing in a formalised integrated risk management programme. International diversification (IDIV) entails higher levels of business uncertainty and risk, which may propel a firm to investigate and consider the formalisation of an ERM programme. The evidence of this study is in tandem with the Hoyt and Liebenberg (2011) study, who found international diversification to be directly associated with an integrated risk management programme because these companies are exposed to a myriad of sophisticated risk scenarios which compel them to institute an internal control system.

The evidence regarding the nexus between financial slack and Tobin's Q indicate a significant indirect (direct) correlation to Tobin's Q (FE = -0.0156, Pooled = -0.0945**, GLS = 0.0800***, LSDV = 0.00408, GMM-DIFF = -0.0329, GMM-SYS = 0.00485). The findings are in line with the Pagach and Warr (2010) study who employed financial slack in their equation to test the determinants for the head of the ERM programme employment determinants equation. They contend that those who employ integrated risk management may command superior levels of financial slack because the CRO regularly brings key risk information to the boardroom table, which helps to curb the risk of bankruptcy by reducing information asymmetries. Financial slack relates to the proportion and summation of the magnitude of cash, cash equivalents, and financial assets held for trading in relation to the total asset base. Technically, the CRO may explicitly encourage the chief finance officer (CFO) to maintain very low levels of slack because of the presence of competent risk transparency and curtailing of the agency and moral hazard technicalities (Hoyt and Liebenberg, 2011).

This study revealed a positive (negative) association between company beta (and EBIT) and Tobin's Q respectively. (Firstly: Beta and Tobin's Q (FE = 0, Pooled = 0.736*, GLS = 0.759***, LSDV = No Value, GMM-DIFF = 0.0736, and GMM-SYS = No Value, Secondly, the nexus between EBIT and Tobin's Q is mostly negative under nearly all models tested). Beta is equal to the rate of change of the company share price in relation to the overall market. Abdullah et al., (2017) argue that the adoption and embedment of ERM across a corporation enhances share price behaviour, reduces the cost of borrowing, improves resource rationalisation, and enhances the synergistic response to a cross-section of enterprise risks (Segal, 2011). An effectively designed integrated risk management enables a firm to cut costs and increase revenues, and improves the ability of a company to create, protect and sustain the market capitalisation of a company. Lenders are easily convinced to help well managed firms who also demonstrate strict risk management guidelines and protocols (Nocco and Stulz, 2006). An effective internal control system enables a firm to monitor the entire risk portfolio for a firm. The advantages and disadvantages of implementing a holistic approach to risk management varies from company to company, and the benefits of ERM tend to be contingent upon specific contextualised settings (Beasley et al., 2008).

4.5 Chapter Summary

A discussion and analysis of the main results of the study were indicated in this chapter. The various methodologies and the respective results or outputs were provided. Correlation and multivariate analyses were discussed to identify significant associations amongst all the variables of the study. A detailed critical analysis was given on the nature and direction of correlation between the regressants and the regressors. The next and final chapter five discusses the conclusion and recommendations of this study.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The aim of this study was to determine the impact of integrated risk management on the value of companies and to examine the nexus between ERM and firm performance. The main highlights of the findings, value of this study and how it contributes to the existing literature on ERM, as well as suggestions on how future scholars can enhance research in similar studies in finance are discussed. A discussion on the recommendations and conclusion of the study is also be provided.

5.2 A Summary of the main results of the study

The effects of ERM implementation on both historical, accounting-based and forward-looking, market-based performance of listed companies in South Africa were investigated. This study adds to the already existing body of knowledge on ERM and the value of formalising an integrated risk management approach. The study also indicates the key correlations between ERM and firm performance (firm value) in an African, emerging market context. The key findings show that integrated risk management is significantly and directly associated with the value of companies, engaged in different sectors of the economy. An important finding is that integrated risk management impinges a highly significant impact on firm value, when the Q ratio is employed.

The main valuation effects are associated with firm size, sales growth, ROA, AO and IDIV, besides ERM adoption itself. The findings also show that integrated risk management can adversely affect the performance of a firm. Interestingly, the study finds LF, DIV and FS to be insignificant. The results on the payment of dividends are inconclusive in line with prior empirical findings. Thus, both the primary and secondary objectives were addressed through a comparative review of global literature on ERM, and the research methodology employed in this study. Hypothesis one (integrated risk management does not improve firm performance) was accepted, showing that ERM is inversely associated with firm performance, in line with Abdullah et al., (2017). The second hypothesis was however, rejected by the findings of this research, indicating

that ERM improves the value of companies, similar to the evidence from Gatzert and Martin (2015), Grace et al., (2015), and Kommunuri et al., (2016).

The ERM function is evolving into a main discipline for firms as operating landscapes become increasingly volatile and as firms seek to consolidate and protect shareholder value (Segal, 2011; Chapman, 2011). In TRM protocols, firms respond to risk in silos, and scholars have studied only limited pockets of the firm risk management conundrum. Earlier studies on risk management have examined the correlation between derivatives and company value. Over the past decade, firms have started to embrace ERM, but evidence on the relationship between ERM and firm value (and performance), has been limited, especially in an African emerging market context. The main cause for limited research is lack of credible data (Hoyt and Liebenberg, 2011). This study used credible data sources comprising the iress INETBFA database, audited integrated reports with consolidated annual financial statements and corporate governance pronouncements to enable the convenient sifting of statistical inferences from the data thereof.

This study examined the impact of ERM usage on firm performance and value, measured by return on assets and the Q ratio respectively. The study employed the FE panel data to investigate the value and performance implications of integrated risk management. The findings support the Lin et al., (2012) and the Abdullah et al., (2017) studies that ERM usage is likely to adversely affect firm performance. It also supports the arguments by Chapman (2011) and Segal (2011) on the time constraint of implementing an integrated risk management programme. ERM programmes in emerging markets like South Africa are still evolving (Gup, 2010; Tahir & Razali, 2011). Some scholars argue that inculcating a risk aware culture is very difficult since character takes many years to form (Rochette, 2009). ERM requires substantial resources to establish, with significant investments in people, time, money and other resources (Segal, 2011). One of the main findings of this study, as mentioned above, showed that ERM is negatively associated with company performance and contradicts the contentions by risk management proponents such as Segal (2011). Moreover, ERM is firm specific and the approaches, resources, and philosophies differ across industries. Thus, the benefits and costs associated with ERM differ from one firm to another. Insights from this study could be employed to enhance the development and

review of corporate governance standards in South Africa. Furthermore, findings of this study provide valuable insight for regulators in formulating policy and guidelines related to corporate governance prescripts in South Africa. Integrated risk management is a relatively new paradigm in South Africa. This study therefore helps to formulate policy to improve risk governance pronouncements, which in turn improves corporate value. More improved risk management transparency efforts and disclosures could help reduce uncertainty in business, which improves corporate image and goodwill.

This study's findings on ERM's effect on firm performance, as measured by ROA could be used to dispel ERM misconceptions across industries that ERM is a magic wand that can improve firm value overnight. The first hypothesis for this study was accepted which means integrated risk management may take considerably longer periods to realise firm performance or indeed value. The ERM conundrum requires time together with other resources to fully realise its potential benefits. It requires candid and ultimate commitments from senior management and the board and huge financial outlays to catalyse the success of this investment and ensure the accrual of ERM benefits in the long run. Similar to other studies, this study also encountered several limitations. The main approach employed by this study to identify ERM adoption by firms may not be able to capture all the ERM activities in sample firms. Furthermore, the sample size (45 companies) of this study is relatively small, with 663 firm-year observations for firms selected from various industries on the JSE. However, statistically, if the sample size is generally greater or equal to 30 (i.e. $n \geq 30$), the sample is regarded as generally representative of the population under study (Wegner, 2016). Some scholars conducted their analyses on small sample sizes. McShane et al., (2011) used only about eighty observations while Baxter et al., (2013) used approximately one-hundred and-seventy firm-year observations. Future research can examine international data covering longer time periods.

5.3 Value and contributions of the study

This study analysed the impact of integrated risk management on firm performance (and value) for JSE listed firms from various industries, over a seventeen-year period, from the year 2000 to the year 2016. Previous empirical evidence on the benefits of integrated risk management to the best of the author's knowledge, have studied only

one industry, like technology firms only, financial firms only, and insurance firms only (Hoyt and Liebenberg, 2008; 2011). This study used a sample of firms from across various industries on the JSE. This enables the generalisation of research findings to many other different settings. Moreover, this study is one of a few studies of its kind, to have been conducted to analyse the quantitative value relevance and implications of ERM on firm value and performance in South Africa on the JSE. The preceding studies on ERM in South Africa, had a purely qualitative research paradigm. In contrast, this study employed a purely quantitative research approach which provides hard findings to test the proposed research hypotheses. The research design used, therefore provides a quantitative flavour to the ERM literature and body of knowledge for emerging market economies with an African context.

A long-time frame was chosen for this study. Few studies analyse periods of over ten years. The sample period was from 2000 to 2016, which is a period of seventeen years (almost two decades). Most studies in finance use a five-year or ten-year time horizon (for example Njuguna, 2015; Marozva, 2017; Kommunuri et al., 2017). Earlier studies have used the maximum-likelihood treatment effects model (for example Pagach & Warr, 2010). A combination of five different methodologies were employed in this study (Tables 4.4, 4.5, 4.6 and 4.7) as part of robust check.

This study highlighted that the value and use of ERM by JSE listed firms has increased from the year 2000 to the year 2016, which could be attributed to the market's increased perceived value of ERM on firm value. The study's conclusions are in tandem with the theoretical scholarly argument suggesting that firms with an ERM programme enhance their market credibility which also helps to reduce or alleviate the agency costs and moral hazard technicalities. The findings of the research also lend weight to COSO (2004)'s recommendation that ERM adoption helps firms to create, protect and sustain firm value.

Integrated risk management in Africa is still relatively underdeveloped, with respect to higher embedment (maturity) levels and its practical application in emerging economies, such as South Africa (Kommunuri, et al., 2016). As listed companies are moving towards more sophisticated ERM levels of maturity, future studies need to examine the benefits of ERM in a broader light in emerging economies, like South Africa. The awareness of the full value implications of ERM adoption could provide a

more compelling business case for firms to design proper ERM systems. A major drawback of the present studies is the inadequate and unclear disclosures regarding the level of ERM embedment for firms. Consequently, as per prior empirical studies on ERM, the study used the information provided by companies in their integrated annual reports and corporate governance statements.

Our analysis provides an addition to the already increasing literature for the integrated risk management body of knowledge vital for more research into ERM value relevance. A plethora of studies employs qualitative research techniques such as surveys. These techniques indicate useful insights into qualitative importance of embedding an ERM programme into the operational processes of the organisation. However, surveys and other techniques of research lack the technical quantitative rigour to answer the fundamental question on whether an integrated risk management programme enhances the value of shareholder wealth. This research study responds to this question using a well-established method (the GMM).

Empirical evidence from this study provides an African emerging market perspective on the benefits of integrated risk management. Companies that are contemplating ERM adoption may rely on evidence from this study to build a compelling business case to institute an ERM protocol. It has been demonstrated in this study that traditional silo-based risk management is now relatively defunct and has been replaced by ERM which is an end-to-end integrated approach to risk management, which holistically manages the firm's entire risk portfolio. Progressive firms such as listed companies may consider the institutionalisation and embedment of ERM through deliberate board approved policies which formalise the use of ERM across the entity. National governments may consider the results of this study to craft national ERM strategies and policies, for example to design national ERM frameworks which countries may utilise to manage country-wide risks using ERM tools and techniques. ERM could also be replicated into the ministerial operational ethos and performance agreements, similar to the use of the integrated approach to risk by listed firms. Moreover, countries and various types of firms in all forms of markets could consider using ERM to address all key risks to which they are exposed. The ERM tools and techniques may thus be incorporated into the national policy frameworks for countries, at national, provincial

and local levels. Firms that are currently non-ERM users may need to consider adopting ERM to enhance their ability to manage the risk-return conundrum.

5.4 Limitations of the Study and Suggestions to improve future studies on ERM

The study used a relatively smaller sample of 45 JSE firms, given the size of the population from which the sample was selected. The JSE is the largest bourse in Africa. Statistically, larger samples may be more representative of the population under study (Wegner, 2016). This may have affected the robustness of the findings. Firms from various industries were selected to constitute a cross sectional sample comprising firms with different regulatory and market contexts. This aspect may present problems of industrial and market differences. Hoyt and Liebenberg (2011) for instance, used firms from only one industry to control for this problem. An industry dummy and company specific factors were however incorporated into the financial econometric modelling. Moreover, the study covered the period of the global financial crisis from 2007 to 2009. It may be essential for future studies to look at the value effects of integrated risk management prior to and subsequently after the problem.

The financial markets in Africa in general, for instance, East African contexts, have been poorly researched (Njuguna, 2015). Similarly, the ERM value relevance in listed firms in emerging markets like South Africa have limited empirical evidence to justify the huge investment required for effective ERM implementation. Therefore, the quantifiable value effects of ERM on other related geographic areas should also be examined to explore and unlock how firms can benefit from ERM. Steps should be taken to ensure that an integrated approach to risk management is effectively institutionalised across the firms.

Empirical evidence on the impact of integrated risk management on firm value and performance should be re-visited using a combination of more robust methodologies of testing the value of ERM. Subsequent research could employ a mixed methods approach to utilise, inter alia, the MLE model, and the generalised method of moments to simultaneously control for firm- specific and problems of endogeneity, multi-collinearity, autocorrelation, heteroskedasticity, and model misspecification. This could minimise incorrect statistical inferences from the data.

Future research using South African data could use surveys (Beasley et al., 2005a), questionnaires (McShane et al., 2011) for a more detailed ERM interrogation. Future studies could also consider larger and international data samples, across continents, using global comparative studies which could reveal the differences and similarities in the implications for ERM implementation.

In the future, researchers examining the quantitative benefits of integrated risk management to firms may use multi-disciplinary research (Njuguna, 2015). Researchers can use behavioural finance, strategic management, actuarial science, social sciences, mathematics, computer science and ERM to find novel solutions inherent in risk and its management. The synergies and interactions amongst different disciplines can help unlock the further hidden value benefits of ERM to companies. Regardless of the differences in data and methods employed, there are common elements which point to the benefits of instituting ERM. It is clear that though differences appear, researchers indicate that ERM generally benefits companies that embrace it in the long-run, in the form of qualitative and quantitative benefits. Specifically, studies on integrated risk management in the insurance industry suggest that ERM generally adds value to the firm.

More research into ERM determinants and their value and impact to the firm need to be undertaken. Increasing sample sizes and using global datasets can uncover anomalies in national and sectoral settings on the determinants and effectiveness of an ERM function. A hindrance to good research is the lack of reliable data sources. Improvements in technology like automated online databases and mining methods can be employed.

The results of this study highlighted further questions for subsequent research. Questions which may be asked include, what is the required level of maturity for an ERM programme to contribute to firm value? What are the main variables that interact with ERM to enable the direct contribution of ERM to value? Does a strict corporate risk culture affect the value of a firm? Can companies with a strong risk culture assume higher risks in pursuit of value? Does the value of ERM have a limit or are the benefits infinite (is the value relevance of ERM directly associated with the law of diminishing return from economics)? Can the benefits of ERM be compared to other functions like finance, manufacturing, internal audit, information technology and procurement? The

questions might need answers which may assist firms to creatively solve many problems in firms. This study indicated that ERM proliferation is increasing rapidly and more questions need quick and effective answers to solve managerial complexities in the course of business.

Other avenues for future study could relate to the exploration of new methods that integrated risk management contributes to firm value and performance. Different sets of variables could be employed to experiment and seek if ERM affects firms in new ways.

5.5 Recommendations

Insights from this study could be used by senior management and boards to refine ERM related policy decisions and accentuate the stature of risk management in companies and other organisations globally. The risk intelligence capabilities of firms could be ameliorated as a culmination of embedding leading practice ERM. In the same light, companies and other organisations can ensure corporate sustainability through intelligent risk decision making and effective ERM deployment within board approved risk appetite and tolerance frameworks.

Data on ERM value relevance was derived from the iress INETBFA database. This data is very costly to collect and highly cumbersome to assemble if done manually. This represents a serious problem to researchers without adequate resources to pull through the demands of the project. It would be beneficial for researchers if the market data were easily accessible. The author was privileged to have accessed this very expensive global database for listed firms through a scholarship extended by the Master's and Doctoral Research Department of the University of South Africa. Other budding researchers may not be as privileged and could face this hindrance and thus, thwart their academic ambitions thereof, limiting the potential increase and enhancements to the existing ERM literature.

Researchers can explore larger international samples with longer periods in order to investigate the value implications of adopting ERM. This could lend more weight to the power and robustness of the tests. Larger samples and more refined research variables can enhance the quality of research output.

Future studies may also explore the use of a combination of different methodologies, including the use of a combination of interviews and questionnaires to augment the quantitative approaches to multivariate regression analysis. Moreover, the global research databases such as the Info Pro, the Osiris, the iress INETBFA, and the Compustat, for instance, could be programmed differently. This may enable quicker, seamless, ubiquitous and real-time data mining and warehousing for ERM related formulae and computations. The formulae and calculations inter alia, include the CAPM, the arbitrage pricing model (APT), the Black Scholes Merton Model (BSMM), the Du Pont Model, the derivatives computations and the Greeks, the different betas, the variance-covariance computations, risk-based economic capital calculations, multivariate regression analysis together with the maximum likelihood treatment effects (MLE) and the generalised method of moments (GMM) models. This could substantially minimise computational time in data analysis and reporting for many researchers in financial econometrics and other ERM affiliated calculations and paradigms.

5.6 Conclusions

The primary aim of this study was to determine the impact of integrated risk management on firm performance and value over a period of seventeen years, from the year 2000 to the year 2016. The results on the impact of integrated risk management on firm performance and value are mixed because an inverse correlation between ERM and return on assets was exhibited, while a significantly direct correlation was reported between ERM and firm value. However, since the Q ratio reflects the forward-looking perceptions of company value by investors, it is regarded as a more powerful and robust measure than the historical, accounting-based measure of return on assets.

The firms listed on the JSE have increasingly adopted ERM as one of the key functions of their operational ethos. This is illustrated by Figure 4.1 in Chapter 4 which reports that from the year 2000 onwards firms adopted ERM at a faster rate until almost all firms had formalised ERM by the year 2016. This increase in ERM adoption can be attributed to the pressure to conform to the JSE listing requirements, King IV Report for South Africa, the Companies Act, 2008, among other legal and regulatory prescripts. It is vital to note that in South Africa, ERM adoption is not a legal

requirement (compared to other geographic areas like the USA, where the Sarbanes-Oxley framework is part of the legal and regulatory regime).

Accordingly, JSE listed firms have significantly benefited from instituting an ERM program, and this has led to the enhancements in firm value (Gatzert and Martin, 2015; Kommunuri et al., 2016). This has also resulted in improved revenue and cost efficiencies than before the year 2000 (Grace et al., 2015).

5.7 Chapter Summary

The main findings of the study were discussed, the contributions to the study were given and a discussion on the suggestions for future research was provided. Subsequently, a discussion of the recommendations and conclusions was also indicated.

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APPENDIX 1

EXAMPLES OF ERM SEARCH "HITS"

Example 1— Successful Hit

"The Company also has begun to use Enterprise Risk Management ("ERM") in evaluating its risk. This involves reviewing its consolidated and interdependent credit risk, market or funding risk, currency risk, interest rate risk, operational risk, strategic risk, reputational risk, model risk, and legal risk across all of its businesses, and the development of risk-adjusted return on capital models where the measure of capital is based on economic stress capital. The board of directors considers a list of aggregated corporate risks and monitors management's response to the management of the risks thereof. Strategy, risk management, governance and performance monitoring are inseparable".

Example 2— Successful Hit

"Through Enterprise Risk Management initiatives, we have identified and managed three separate risk categories that we believe could impair our Company's ability to grow profitably. Those major risk categories include:

(1) Underwriting Risk: Failure to grow earned premium and earn a GAAP 96 Combined

Ratio;

(2) Investment Risk: Failure to maintain a liquid diversified investment portfolio.

(3) Financing Risk: Failure to maintain flexibility and earn the cost of equity capital.

We believe that the best way to maximize shareholder value is consistently to achieve our financial objectives by actively managing identifiable risks. Our enterprise risks are managed centrally by a dedicated risk management committee which reports directly to the board."

Example 3— Successful Hit

". . . the Audit and / or Enterprise Risk Management Committee is responsible for reviewing the Company's risk management processes in a general manner and for oversight of enterprise risk as defined by the Committee of Sponsoring Organizations (COSO) . . ."

Example 4— NOT a Successful Hit

"Structured financial and alternative risk transfer products cover complex financial risks, including property, casualty and mortality insurance and reinsurance, and business enterprise risk management products. The risks are managed by dedicated specialists of the respective risk classes."

Example 5— NOT a Successful Hit

"…the management of the various financial risks to which the company is exposed is discussed in detail, in the supplementary notes to audited consolidated annual financial statements. The board considers a list of risks in conjunction with the consolidated financial statements as part of its financial risk management oversight and governance responsibilities".

Source: Adopted from annual integrated reports of sample firms and Hoyt and Liebenberg (2011).

APPENDIX 2

ETHICAL CLEARANCE CERTIFICATE