Article

The Interdependence of Risk Management, Corporate Governance and Management Accounting

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Abstract

Corporate governance and risk management values that are not sufficiently established and affected may lead to the growth potential of South Africa as one of the economically leading countries in Africa being inhibited. The objective of the study was to test the interdependence of risk management, corporate governance, and management accounting in the top performing public listed companies of the Johannesburg Stock Exchange. A literature review, structured questionnaire and document review were used to conduct the study. The empirical results of the study demonstrate that there is a side-to-side interdependence of risk management, corporate governance and management accounting. It is recommended that future studies cover the risk management aspect of fraud, stakeholder management and the areas of compliance that have not been covered in the study.

Keywords: risk management; corporate governance; management accounting

Introduction

"Risk management is a key business process within both the private and public sector around the world. Effective risk management and the resulting controlled environment are central to sound corporate governance and for this reason, much of the law that has been created in response to corporate collapses and scandals, now requires effective risk management." (ISO

UNISA university of south africa PRESS

Southern African Business Review
https://upjournals.co.za/index.php/SABR
Volume 22 | 2018 | #4344 | 30 pages

https://doi.org/10.25159/1998-8125/4344
ISSN 1998-8125 (Online)
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2008). The prospects of risk and governance concepts, like management accounting (MA), have to be managerially actionable with regard to their proficiency to be interpreted in technical, logical, and predictable terms (Bhimani 2009). Whilst risk management (RM) is viewed as the cornerstone of modern management control (Bhimani 2009), it is becoming clear that MA is implicated in corporate governance (CG) (Seal 2006). However, observers note that corporate boards do not perform their duties diligently in the exercising of their fiduciary duties in RM (ACCA 2008; FCIC 2011; Kirkpatrick 2009; S1074 2009). The role of the board is broken down into strategy setting, implementation and monitoring, effectiveness in monitoring the system of internal controls, RM and investment decisions (Dallas 2004; King III 2009). The board should set standards and values and confirm that its duties to the stakeholders are understood (FRC 2010).

RM is a term that has received major resonance in the media in the wake of the 2008 global financial crisis (Lewis 2008; Millo and MacKenzie 2009). Failure in the risk management system associated with inadequate practices in CG played a major role in the failure of numerous companies during the financial crisis of 2008 (Kumar and Singh 2013). Blundell-Wignall, Atkinson and Lee (2008) view CG as the key role player in the 2008 financial crisis on the Bank of Switzerland while Kumar and Singh (2013) emphasised the failure of banks and their boards in understanding the risk related to the complexity of financial products. Kumar and Singh (2013) further state that failure at board level to take into account the dynamics of risk issues prior to the approval of the company strategy had a major impact on the crisis. As such, Kirkpatrick (2009), Kumar and Singh (2013), Saltaji (2013), and Tarraf (2010) link failure in RM to poor CG and conclude that there is an unbreakable bond between CG and RM.

Failure to provide accurate MA reports and using these reports efficiently in RM may have a negative impact on CG. This evokes the necessity to understand the interdependence of CG, RM and MA for companies. The use of financial accounting and MA on a day-to-day basis has been limited (Rasid and Rahman 2009). This is evident by the criticisms levelled against the accountants and accounting in the wake of the financial crisis involving accusation of insufficient clarity in what was being measured, the wrong things being measured or things being measured inappropriately, lack of standards, inadequate transparency and poor ethical conduct (Mainelli 2009).

The OECD (2009) report shows failures in RM structures, inadequate information reaching the board about risk, the absence of monitoring of RM by the board and insufficient governing standards. This may suggest that there is a missing link and as such, this article introduces the interdependence of RM, CG and MA. Hoyt and Libenberg (2011) and McShane, Nair and Rustambekov (2011) affirmed in their studies that there is correlation between CG and RM. Hence, the latter authors limit this correlation to companies with low or adequate enterprise risk management (ERM) ratings as opposed to companies with strong or excellent ERM ratings whereas the former limits correlation only to financial services. The element of MA and its role were not factored in these studies.

The studies of Carmen and Corina (2013) and Lay and Jusoh (2013) examined the connection between CG and MA only focusing on the strategic approach. However, the argument of Bhimani (2009), Mayanja (2010) and Ratnatunga and Alam (2011) that the interdependence has not flourished to the level it should have, still prevails. This is explained by the fact that the authors were unable to identify a study that has looked at the interdependence of CG, RM and MA jointly. Furthermore, the scenario of this interdependence may not have been tested from a South African public-listed companies context. South Africa is considered one of the top progressive countries in Africa, despite it being an emerging state with growth potential. However, CG and RM values which may not be sufficiently established and affected may lead to the aforementioned potential being annulled, which in turn could adversely shake the economic growth and wellbeing of the country (Young 2010).

Requirements of the Companies Act of 2008 and the King III report (2009) are not aligned with the roles of the board of directors, and this creates disharmony. Furthermore, there are some instances in the King III report (2009) in which companies are either required to comply with or explain the King III report. This illustrates that RM and CG are still the issues subjected to public policy debates on organisational controls in South Africa. It is not sufficient for a company to only pursue the implementation of risk controls, it may also need to deploy such controls in such a manner that they are observable and transparent to stimulate a company's legitimacy. As such, the article argues that RM, CG and MA should be treated as intricately interdependent.

The layout of the rest of the paper is as follows: the next section lays the theoretical foundation of the study and is followed by the literature review. The objectives, the importance of the

study and research methodology are discussed next, followed by a discussion of the results and the analysis thereof. The article concludes with conclusions and recommendations for future work.

Theoretical Perspective

Agency theory stresses the significance of the role of monitoring and controlling, whereas resource dependence theory puts an emphasis on an advisory role (Daily, Dalton and Cannella 2003). An effective CG tool diminishes agency conflict and the companies' cost and, therefore, enhances company performance (Young et al. 2008). It is the responsibility of the board to demonstrate manifold constituencies in making decisions (Devinney, Schwalbach, and Williams 2013) and display accountability and transparency in their duties performance (Ntim and Soobaroyen 2013). In addition, it is the task of the board to ensure that CG practices accepted by the company are effective as the board is eventually accountable for the financial performance and the effective running of the company (Dharmadasa, Gamage, and Herath 2012). MA facilitates compliance to CG as stipulate by the King III report (2009) that the board is responsible for ensuring compliance to CG practices. In addition, MA reports are essential for controlling and monitoring which are components for CG, therefore, this may imply interdependence between MA and CG.

Literature Review

The understanding of interdependence between CG and RM assists a company to better understand risk, improvement and deliverance of a company's objectives and in mitigation, assessment, and management of risk in an appropriate manner (Brown, Steen and Foreman 2009; Cingula 2006; Manab, Kassim and Hussin 2010). Risk analysis is imperative in setting controls and the report presented to the board has to articulate all risks and their mitigation strategies in executing the organisational strategy (Davies 2013). It is the duty imparted by the King III report (2009) that the board plays a prominent role in the strategy development process. Furthermore, risk analysis is one of the elements that assist the board in executing this task; the board might not be able to execute this task in isolation of RM.

The insufficiencies of CG devices seldom cause failure in effective checking and regulating the decisions of top management which results in emerging of systematic risk (Saltaji 2013). CG empowers the effective performance of the company in combination with regulations,

policies and procedures, processes, rules and suitable voluntary private sector practices (Saltaji 2013). Therefore, a system of internal controls as a mechanism of RM supports CG in enhancing the performance of a company. This is consistent with the argument by Gordon, Loeb, and Tseng (2009) and Hoyt and Liebenberg (2011) that there is a positive correlation between CG and RM in enhancing company performance. According to the King III report (2009), RM is a direct component of CG. The RM procedures for a company need to be reviewed by the board (Dallas 2004). This review needs not to be solely a compliance exercise, it should be understood that RM is the governance tool and failure to properly manage the risk may attribute to ineffective CG.

Furthermore, it is the responsibility of the board to set the organisation's strategic objectives (FRC 2010), and MA reports are best for this task (Mayanja 2010). The importance of designing and developing a management accounting system aims to achieve the strategic objectives of the organisation and the information generated by the system should be useful to value creation and ensuring the long-term success of the company (Carmen and Corina 2009). There is a link between MA and CG in enhancing company performance, strategy formulation and assisting the board in performance of its duties (Larcker and Tayan 2011a; Larcker and Tayan 2011b; Ratnatunga and Alam 2011; Van der Stede 2011). This may imply that MA is not a matter of choice in the company, but it is a requirement for effective CG. As much as MA is not mandatory like financial accounting, it is the lifeblood of the company and, therefore, strengthens CG.

Company governance is divided into conformance and performance, which are also referred to as value creation (Ratnatunga and Alam 2011). Both components serve the purpose of benefiting a company's stakeholders with the aim of protecting and enriching the value of the company (Carpenter and Westphal 2001; COSO 2002; Charan 2005; CIMA 2004). These two factors are intertwined and can address the strategic objectives while taking care of the performance measures, such as net profit, return on investment, earnings per share and guarantee results accomplishment and strategy achievement (Ratnatunga and Alam 2011). Therefore, it may be argued that MA enhances the company's performance, assist the board of directors in giving accurate measurement of the company's present value taking into consideration the entire cost and value aspects.

The design and use of strategic MA techniques are associated with strategic matters concerning external information necessities in order to address economic environment uncertainties to support strategic decisions (Carmen and Corina 2013). It is the task of the board, as part of CG, to ensure the formulation of a successful strategy, and MA reports play a significant role in enabling this task. Strategic management accounting is treated as the basic approach to strategic positioning, which incorporates Porter's competitive advantage theory and his strategic cost exploration (Roslender 1995). The impact of MA as a useful tool in strategic governance may not be ignored in sustaining the strategic positioning of the company in the end. Failure to consistently review the strategic position may impose a going concern risk, hence, MA may be used as a mitigation strategy. This may suggest a triangle side-to-side interdependence of RM, CG and MA and the importance for a company to realise this interdependence.

The concept that has been consistently used as the loophole to permeate normal organisational order within MA is risk (Aradau and Van Munster 2007; Dean 2010). MA plays a significant role in making available information for RM in a company involved in the business of RM (Soin 2005; Williamson 2004). According to Rasid and Rahman (2009), MA and RM are anticipated to supplement each other and achieve the objective of helping decision-making of a company. Williamson (2004) also views MA as a backing to RM in various ways, including quantification of goals, measuring the results of likely consequences of risk measures, examining the expenses and values for practices of RM and measurements of actual performance against exposure to risk. As such, for the good of CG, it may not be appropriate to isolate MA from RM. The consequences of not appropriately addressing MA may adversely affect RM and, therefore, CG.

The familiar strategy for investors to manage risk relating to securities especially if it is a portfolio risk is through diversification (Arnold 2013). According to Du Toit et al. (2010), it is very important to evaluate the risk associated with investment given that the expectation of high returns is coupled with high risk. As such, the assessment of risk is important in investment decisions and MA tools are utilised to define the risk linked to the investment. The main objective of the company is to maximise shareholders' wealth (CIMA 2014). In the absences of the use of MA investment appraisal techniques, it may be difficult to evaluate capital projects and managing the risk associated with those projects accordingly.

The use of investment appraisal techniques enables the board to know whether the project will result in a positive net present value, measure the period in which the initial outlay of project can be paid back (Vigario 2007) and, furthermore, enhance the governance of the organisation (CIMA 2014). Currently, there is no substitute known for investment appraisals other than MA investment appraisal techniques. This suggests that MA may not be excluded from RM and may directly influence CG. Atrill and McLaney (2009) assert that there is involvement of significant amounts of money in investment decisions and mistakes made may result in a significant impact for the company, if not catastrophic. This implies that poor governance in investment decisions may have serious outcomes and risk should be appropriately managed in this area as failure to do so may impact the company negatively. Therefore, MA seems to align CG and RM in this area.

Budgeting is used as the monitoring agency to guarantee that the company does not undertake high-risk activities (Rasid, Rahman and Ismail 2011). They assert that MA academics have also scrutinised the association between RM and MA control as the company's multiple control system. Mustapha and Ghani (2013) indicate that the high importance of RM is complemented by the high importance of budgetary accounting practices. However, Kumarasinghe and Willet (2010) do not see MA as the solution to CG but they argue that poor MA may negatively affect CG.

Objectives of the Study

The research problem is rooted in the fact that CG and RM values that are not sufficiently established, and if they are affected may lead to South Africa's growth as one of the top progressive countries in Africa being annulled. Therefore, this study aims to jointly examine the interdependence of RM, CG and MA in South African public listed companies. The objectives of the study are to:

- establish how RM supports CG and MA and vice versa.
- determine the impact of RM on CG and MA and vice versa.

In order to achieve the research objectives, the research question regarding whether there is an interdependence of RM, CG, and MA, was split further according to the categories as listed below:

1. Whether there is interdependence between CG and RM in:

- achievement of the company objectives.
- enhancing company performance.
- assisting board in performance of its duties.

2. Whether there is interdependence between MA and CG in:
   - strategy formulation.
   - enhancing company performance.
   - assisting board in performance of its duties.
3. Whether there is interdependence between RM and MA in:
   - decision-making including investment decision.
   - enhancing company performance.
   - planning and budgeting.

Importance of the Study

Despite the fact that MA, RM, and CG are increasingly intertwined and inextricably dependent, this article attempts to tap into the triangle side-to-side interdependence of these variables. The article aims to demonstrate a paradigm of triangle side-to-side interdependence of RM, CG, and MA. The importance of this study is to draw attention to the need of MA within the organisation rather than being a choice as well as its role in aligning RM and CG. It is true, MA is not mandatory like financial accounting, but the purpose of this article is to illustrate that it might not be viable to govern the company smoothly in the absence of MA. Furthermore, the article seeks to demonstrate that RM needs MA to pillar CG, otherwise the foundation of governance is fragile.

Research Methodology

The study started with a literature review. Journal articles were reviewed in terms of aspects informing the research problem. Most of the articles reviewed were one to five years old, however, articles older than five years were also reviewed. Since the study targeted the public listed Johannesburg Stock Exchange (JSE) companies, other information was collected as secondary data from the public domain. The documents reviewed included financial statements, sustainability reports and company profiles.

South Africa has a large number of organisations listed on the JSE as public companies. According to the 2014 board report, the JSE is classified among the top twenty world

exchanges regarding market capitalisation. The World Economic Forum's Global Competitiveness survey for 2013/2014 ranks South Africa number one in regulation of securities and number two for raising capital through the local equity market (Main Board Report 2014).

The research strategy was a survey. The targeted population for the purpose of this study were top performing public listed companies on the JSE. These companies are required to report according to JSE's requirements and bound by the South African Companies Act of 2008. Furthermore, the distinction between ownership and management is clear. As such, the study perceives these companies as portraying the correct image of CG. Therefore, the population was the top 100 performers. Normally, 100 is the cut-off value used in determining top achievers globally (Leedy and Ormrod 2010). However, Gay et al. (2009, 9), cited in Leedy and Ormrod (2010), state, "For smaller populations, say, N=100 or fewer, there is little point in sampling; survey the entire population." Therefore, all 100 top performers for 2014 were included in the sample.

Primary data was gathered through sending the structured questionnaire to the chief executive officers (CEOs), chief financial officers (CFOs) and risk executives of the targeted companies. Pre-testing interviews were conducted in which five of the CFOs within the sample were interviewed prior to sending the questionnaire to test whether the questions made sense and were easily understood by the respondents.

Results and Analysis

The specific aim of the study was twofold: the first was to establish how RM supports CG and MA and vice versa; the second was to determine the impact of RM on CG and MA and vice versa. The hypotheses tested are outlined in Table 1.

Table 1: Hypotheses

Hypothesis 1	H_0:	There is no interdependence between RM and CG
	H_1:	There is interdependence between RM and CG
Hypothesis 2	H_0:	There is no interdependence between CG and MA
	H_1:	There is interdependence between CG and MA
Hypothesis 3	H_0:	There is no interdependence between RM and MA
	H_1:	There is interdependence between RM and MA

The results are based on the empirical study undertaken and will be presented in the following sections.

Statistical Analysis

The statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS). Exploratory factor analysis was used to measure the validity of the instrument whilst reliability of the constructs measured in the study was assessed using Cronbach's alpha. The descriptive statistics (frequencies and proportions) were used to describe the data. The chi-square test for goodness of fit was used to test if the data followed a particular probability distribution. In this case, the distribution was uniform; that is, it was used to test if the number of respondents was equal in each Likert scale category. Correlation analysis was used to determine the correlation between variables. Since the data was on an ordinal scale, Spearman's rank was used to test the extent of the relationship between the variables.

Descriptive Statistics

A total of 52 companies participated in the study out of an intended target of 100, therefore, the response rate was 52 per cent. The main reason for the low response rate might be attributed to the fact that a self-administered questionnaire using e-surveys was used, and that the respondents are senior managers who have tight work schedules. According to Leedy and Ormrod (2010), the response rate might be low and, in this case, to compensate, a document analysis was undertaken using company publications. Table 2 presents the demographic details of the sample.

Table 2: Characteristics of the respondents in the sample

Variable	**Category**	**F**	**%**
Position in company	Risk executive officers Chief financial officers Company senior executive	16 32 4	30.8 61.5 7.7
	Total	**52**	**100**
Size of company	1 to 100 employees 101 to 500 employees 501 to 1 000 employees 1 001 to 5 000 employees Above 5 000 employees	3 3 4 9 32	5.9 5.9 7.8 17.6 62.7
	Total	**51**	**100**
Company turnover	Less or equal to R50 million Between R50 million and R900 million Over R900 million	2 2 47	3.9 3.9 92.2
	Total	**51**	**100**
Presence of chief risk officer (CRO) or risk executive	Yes No	45 5	90 10
	Total	50	100
Use of ERM approach in RM	Yes No	50 2	96.2 3.8
	Total	**52**	**100**

The majority of the respondents were chief financial officers; that is, 61.5 per cent (n=32), whilst 30.8 per cent (n=16) were risk executives officers. Therefore, the majority of the respondents were either in finance or in RM. Most of the companies employ a sizeable number of employees, as evident in the fact that 62.7 per cent (n=32) have more than 5 000 employees. About 92.2 per cent (n=47) of the companies had a turnover of over R900 million in a financial year. In terms of whether the company has a chief risk officer or risk executive, about 90.0 per cent (n=45) indicated that their company have one, whilst 10.0 per cent (n=5) indicated that their company did not.

The respondents were asked to indicate the nature of their company's business. Some companies were involved in more than one sector; therefore, it was a multiple response question. The answers are reflected in Table 3.

Table 3: Nature of business (n=52)

Sector	Frequency	% of cases	Rank
Services	35	68.6	1
Manufacturing	12	23.5	2
Mining	4	7.8	3
Agriculture	2	3.9	4
Retail	2	3.9	4
Construction and engineering	1	2.0	6
Import and distributions	1	2.0	7

The majority of the companies, that is, 68.6 per cent (n=35) are involved in the services industry, whilst 23.5 per cent (n=12) are involved in manufacturing.

The Interdependence of Variables

The majority of participants were in agreement that CG and RM are interdependent in: (1a) assisting the board to perform its duties (84.6%); (1b) achievement of company objectives (75.0%); and (1c) was enhancing company performance (73.1%). The majority of participants were also in agreement that CG and MA are interrelated in: (1a) assisting the board to perform its duties (57.7%); (1c) enhancing company performance (67.3%); and (1d) strategy formulation (55.8%). More than 50% of participants were in agreement that RM and MA were interdependent in: (1e) investment decision (57.7%); (1f) decision-making (55.8%); (1g) planning and budgeting (55.8%). However, the response of 48.1 per cent in (1c) enhancing company performance was low.

Reliability

Measuring of reliability of an instrument is measuring its stability or consistency of responses. Salkind (2012, 397) indicates that "reliability is consistency in performance or prediction." Cronbach's alpha was used to determine the internal consistency or average correlation of items in the instrument to gauge its reliability, i.e. the internal consistency of the instrument. A "high" value of alpha is often used (along with substantive arguments and possibly other statistical measures) as evidence that the items measure an underlying (or latent) construct. George and Mallery (2003, 231) provide the following rules of thumb: that if Cronbach's alpha is "> 0.9 – excellent, > 0.8 – good, > 0.7 – acceptable, > 0.6 questionable, > 0.5 poor and < 0.5 – unacceptable." However, the generally agreed lower limit for Cronbach's alpha is 0.7, although

it may decrease to 0.6 in exploratory research (Hair, Black, Babin, and Anderson 2014). Table 4 shows reliability as follows:

Table 4: Reliability results of interdependence of variables

Area	**No. of items**	**Cronbach's alpha**	**Acceptable level**
CG and RM	3	0.815	Good
MA and CG	3	0.746	Acceptable
RM and MA	4	0.870	Good
Overall	**10**	**0.867**	**Good**

A Cronbach's alpha of 0.7 or more indicates a reliable scale. All the sections were above 0.7 and, according to (Hair, Black, Babin, and Anderson 2010), the generally agreed lower limit for Cronbach's alpha is 0.7. The reliability of the whole instrument was 0.867, which is good, thus overall the instrument was reliable.

Validity

Exploratory factor analysis was used to test the validity of the results. Principal component analysis with varimax rotation was used. The Eigen value method was used to determine the number of factors. Therefore, the number of factors was determined by taking the Eigen value with more than one (1.0). The factors with Eigen values less than one (1.0) were considered insignificant. The factor analysis was done per section. In addition, the factors selected were the ones used to determine whether differences exist in demographic details. Since the sample was 100, and 52 responses were received, factor loadings of 0.5 and above were used to determine significance (Hair, Black, Babin, and Anderson 2010).

Factor analysis was used to group together the rankings in terms of interdependence of variables that were closely related into groups. Out of the ten aspects, one was loading on two factors and was removed from the final factor analysis. This is the aspect: "Q1.7. To what extent is RM and MA interdependent in enhancing company performance?" The final factor solution had a KMO measure of sampling adequacy of 0.712 indicating that the correlations are adequate for factor analysis. Additionally, Bartlett's test enables us to reject the null hypothesis of lack of sufficient correlation between variables since the p-value = 0.000 (< 0.05) which leads to the rejection of the null hypothesis. Therefore, the results from both tests are acceptable and the analysis can proceed.

The communalities indicate the degree to which each variable participates or contributes to the component solution. All communalities were above 0.5. The numbers of factors were determined by taking those Eigen values more than one. The first factor accounted for 30.64 per cent, the second factor for 27.51 per cent, and the third factor for 19.99 per cent. In all, the factors accounted for 78.14 per cent of the variance. In practice, a robust solution should account for at least 50 per cent of the variance; therefore, the factor analysis grouped the variables into three groups, as explained in Table 5.

Table 5: Factor analysis

	Component		
	1	**2**	**3**
RM and MA in investment decision	.853		
RM and MA in planning and budgeting	.790		
RM and MA in decision-making	.788		
MA and CG in assisting the board to perform its duties	.728		
RM and CG in enhancing company performance		.848	
RM and CG in achievement of company objectives		.843	
RM and CG in assisting the board to perform its duties		.821	
MA and CG in strategy formulation			.901
MA and CG in enhancing company performance			.838
	Extraction method: Principal component analysis Rotation method: Varimax with Kaiser normalisation		
	a. Rotation converged in three iterations		

The first factor was named the relationship between MA with RM or CG, the second factor was the extent of correlation between RM and CG, and the third factor was MA tools in CG.

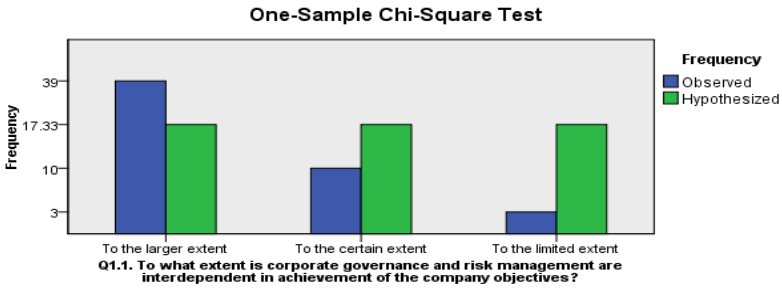
Chi-Square Test to Determine Interdependence Variables

The chi-square test for goodness of fit was used to test whether there was interdependence between variables. The hypotheses tested were to determine whether there was interdependence between RM and CG, CG and MA and RM and MA. The 5% level of significance was using the *p*-value approach. A *p*-value less than 0.05 led to the rejection of the null hypothesis of no interdependence. Only those significant are presented in detail.

Interdependence between RM and CG

The chi-square test on hypothesis 1 was on aspects of achievement of company objectives, enhancement of company performance and assisting the board in performance of its duties.

The null hypothesis of no interdependence was rejected in all aspects since *p*-values were below 0.05 and, therefore, highly significant as indicated in Figure 1.

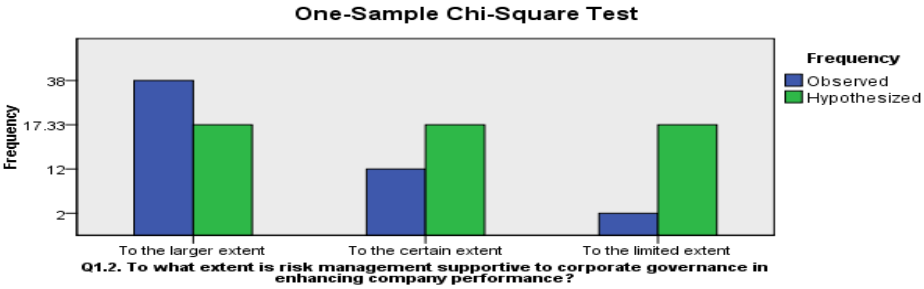


Total N	52
Test Statistic	42.038
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.000

1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 17.333.

Figure 1: Chi-square test for goodness of fit on interdependence of CG and RM on achievement of company objectives

The chi-square value = 42.0380, with a *p*-value = 0.000. Since the *p*-value was less than 0.05, the null hypothesis of equal population proportions is rejected.

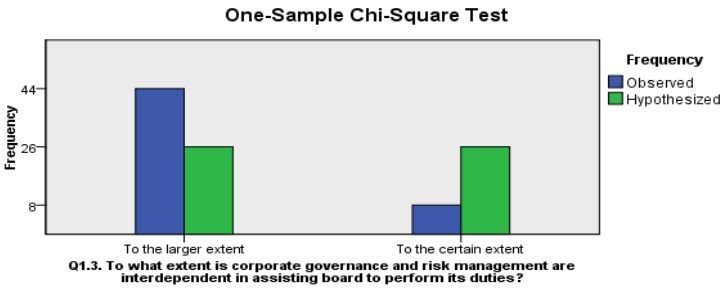


Total N	52
Test Statistic	39.846
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.000

1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 17.333.

Figure 2: Chi-square test for goodness of fit on interdependence of CG and RM on enhancing company performance

The chi-square value = 39.846, with a *p*-value = 0.000. Since the *p*-value was less than 0.05, the null hypothesis of equal population proportions is rejected.



Total N	52
Test Statistic	24.923
Degrees of Freedom	1
Asymptotic Sig. (2-sided test)	.000

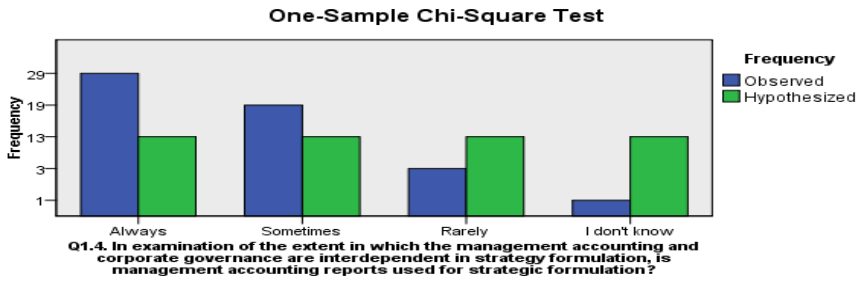
1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 26.

Figure 3: Chi-square test for goodness of fit on interdependence of CG and RM in assisting board to perform its duties

The chi-square value = 24.923, with a *p*-value = 0.000. Since the *p*-value was less than 0.05, the null hypothesis of equal population proportions is rejected.

Interdependence between CG and MA

The chi-square test on hypothesis 2 was on aspects of strategy formulation, enhancement of company performance and assisting the board in performance of its duties. The null hypothesis of no interdependence was rejected in all aspects since *p*-values were below 0.05 and, therefore, highly significant.

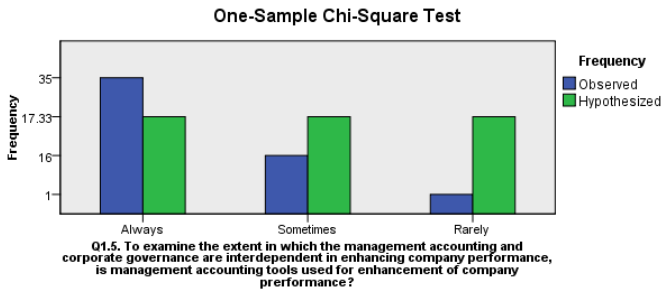


Total N	52
Test Statistic	41.231
Degrees of Freedom	3
Asymptotic Sig. (2-sided test)	.000

1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 13.

Figure 4: Chi-square test for goodness of fit on interdependence of CG and MA on whether MA reports is used for strategy formulation

The chi-square value = 41.231, with a *p*-value = 0.000. Since the *p*-value was less than 0.05, the null hypothesis of no interdependence was rejected.

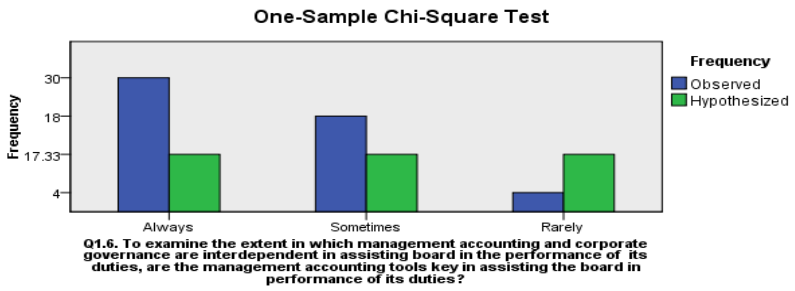


Total N	52
Test Statistic	33.500
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.000

1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 17.333.

Figure 5: Chi-square test for goodness of fit on interdependence of CG and MA on whether MA tools was used for enhancement of company performance

The chi-square value = 33.500, with a *p*-value = 0.000. Therefore, the null hypothesis was rejected since *p*-value is less than 0.05.



Total N	52
Test Statistic	19.538
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.000

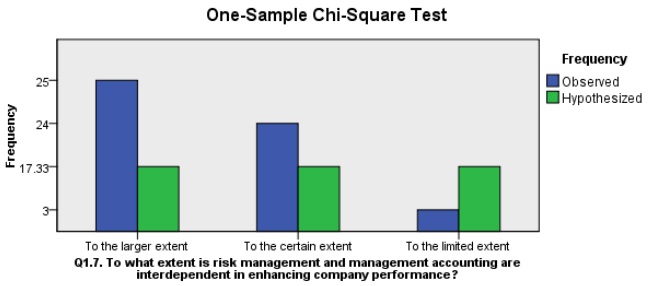
1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 17.333.

Figure 6: Chi-square test for goodness of fit on interdependence of CG and MA on whether MA tools are key in assisting the board performance of its duties

The chi-square value = 19.538, with a *p*-value = 0.000. Since the *p*-value was less than 0.05, the null hypothesis was rejected.

Interdependence between RM and MA

The chi-square test on hypothesis 3 was on aspects of enhancement of company performance, planning and budgeting, decision-making and investment decisions. The null hypothesis of no interdependence was rejected in all aspects since *p*-values were below 0.05 and, therefore, highly significant.

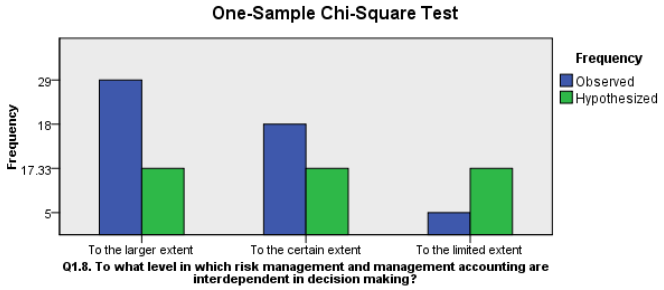


Total N	52
Test Statistic	17.808
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.000

1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 17.333.

Figure 7: Chi-square test for goodness of fit on interdependence of RM and MA on enhancing company performance

The chi-square test gave a value of 17.808, with a *p*-value = 0.000. Thus, the null hypothesis of equal distribution of proportions across categories was rejected.

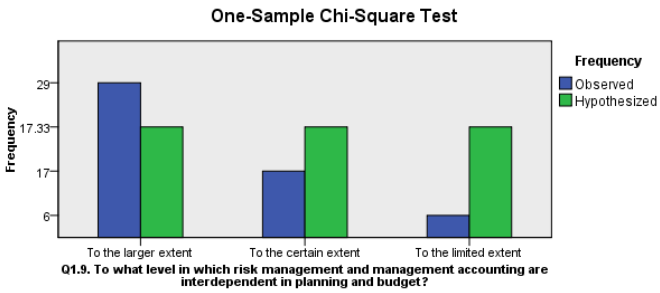


Total N	52
Test Statistic	16.654
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.000

1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 17.333.

Figure 8: Chi-square test for goodness of fit on interdependence of RM and MA in decision-making

The chi-square value = 16.654, with a *p*-value = 0.000. Since the *p*-value was less than 0.05, the null hypothesis of equal population proportions was rejected.

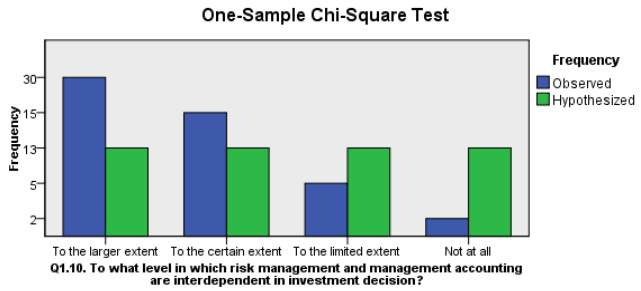


Total N	52
Test Statistic	15.269
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.000

1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 17.333.

Figure 9: Chi-square test for goodness of fit on interdependence of RM and MA in planning and budget

The chi-square value = 15.269, with a *p*-value = 0.000. The null hypothesis was rejected; the information is shown in Figure 9.



Total N	52
Test Statistic	36.769
Degrees of Freedom	3
Asymptotic Sig. (2-sided test)	.000

1. There are 0 cells (0%) with expected values less than 5. The minimum expected value is 13.

Figure 10: Chi-square test for goodness of fit on interdependence of RM and MA in investment decisions

The chi-square value = 36.769, with a *p*-value = 0.000. Since 0.000 is less than 0.05, the null hypothesis of having equal population proportions was rejected.

Correlational Analysis

Spearman's rank correlation was used to specify the relationships between the variables. A 5% level of significance was used. The extent of the correlation between values was determined

by the scale of low effect (0.3 to 0.4), moderate (0.5 to 0.6) and large scale (0.7 to 1.0). The hypotheses to be tested were:

H_0: There is no statistical significant correlation between RM, MA, and CG.

H_1: There is a statistically significant correlation between RM, MA, and CG.

A *p*-value of less than 0.05 would lead to the rejection of the null hypothesis and a conclusion that there is a significant relationship. A *p*-value of less than 0.01 would signify a highly significant relationship. Table 6 gives the results of the correlation matrix.

Table 6: Spearman's rank correlation between variables

Item	Q1.1	Q1.2	Q1.3	Q1.4	Q1.5	Q1.6	Q1.7	Q1.8	Q1.9	Q1.10
Q1.1: CG and RM in achieving company objectives.	-									
Q1.2: CG and RM in enhancing company performance.	0.571**	-								
Q1.3: CG and RM in assisting the board perform its duties.	0.623**	0.611**	-							
Q1.4: MA and CG in strategy formulation.	0.165	0.077	0.068	-						
Q1.5: MA and CG in 1 enhancement of company performance.	0.208	0.214	0.259	0.660**	-					
Q1.6: MA and CG in assisting the board perform its duties.	0.202	0.115	0.174	0.430**	0.652**	-				
Q1.7: RM and MA in enhancing company performance.	0.438**	0.429**	0.405**	0.406**	0.486**	0.588**	-			
Q1.8: RM and MA in decision-making.	0.276*	0.432**	0.477**	0.242	0.495**	0.454**	0.632**	-		
Q1.9: RM and MA in planning and budgeting.	0.522**	0.361**	0.505**	0.180	0.357**	0.447**	0.554**	0.759**	-	-
Q1.10: RM and MA in investment decision.	0.339*	0.425**	0.490**	0.130	0.376**	0.586**	0.490**	0.678**	0.724**	-

The following variables had a strong correlation between signifying high effect:

- Q1.9 RM and MA in planning and budgeting vs. Q1.8 RM and MA in decision-making (r=0.759).

- Q1.10 RM and MA in investment decision vs. Q1.9 RM and MA in planning and budgeting (r=0.724).

The coefficient of 0.759 suggests the strong relationship between RM and MA in planning and budgeting versus decision-making. There is also a strong association between RM and MA in investment decision and planning and budgeting with the correlation coefficient of 0.724. Those with a moderate effect were:

- Q1.2. RM and CG in enhancing company performance vs Q1.1 CG and RM on company objectives (r=0.571).
- Q1.3. CG and RM in assisting board to perform its duties vs. Q1.1 CG and RM on company objectives (r=0.623).
- Q1.3. CG and RM in assisting board to perform its duties vs. Q1.2. RM and CG in enhancing company performance (r=0.611).
- Q1.5. MA and CG in using MA tools for enhancement of company performances vs. Q1.4 MA and CG in using MA reports for strategy formulation (r = 0.660).
- Q1.6.MA and CG in using MA tools in assisting the board perform its duties vs. Q1.5. MA and CG in using MA tools for enhancement of company performances (r = 0.652).
- Q1.7 RM and MA in enhancing company performance vs. Q1.6 MA and CG in using MA tools in assisting the board perform its duties (r=0.588).
- Q1.8 RM and MA in decision-making vs. Q1.7 RM and MA in enhancing company performance (r=0.632).
- Q1.9 RM and MA in planning and budgeting vs. Q1.1 CG and RM on company objectives (r=0.522).
- Q1.9 RM and MA in planning and budgeting vs. Q1.3. CG and RM in assisting board to perform its duties (r=0.505).
- Q1.9 RM and MA in planning and budgeting vs. Q1.7 RM and MA in enhancing company performance (r=0.554).
- Q1.10 RM and MA in investment decisions vs. Q1.6.MA and CG in using MA tools in assisting the board perform its duties (r=0.586).
- Q1.10 RM and MA in investment decisions vs. Q1.8 RM and MA in decision-making (r=0.678).

There was a moderate correlation between CG and RM in enhancing company performance versus achievement of company objectives (0.571), assisting the board to perform its duties versus achievement of company objectives (0.623), and enhancing company performance

versus assisting the board to perform duties (0.611). There was also a moderate correlation between MA and CG in enhancing company performance versus strategy formulation (0.660), assisting the board to perform its duties versus enhancing company performance (0.652). The same moderate pattern was observed between RM and MA in decision-making versus enhancing company performance (0.632); and investment decision versus decision-making (0.678) and in planning and budgeting versus company performance.

The results demonstrate the paradigm of triangle side-to-side interrelationship of RM, CG and MA, as summarised in Figure 11.

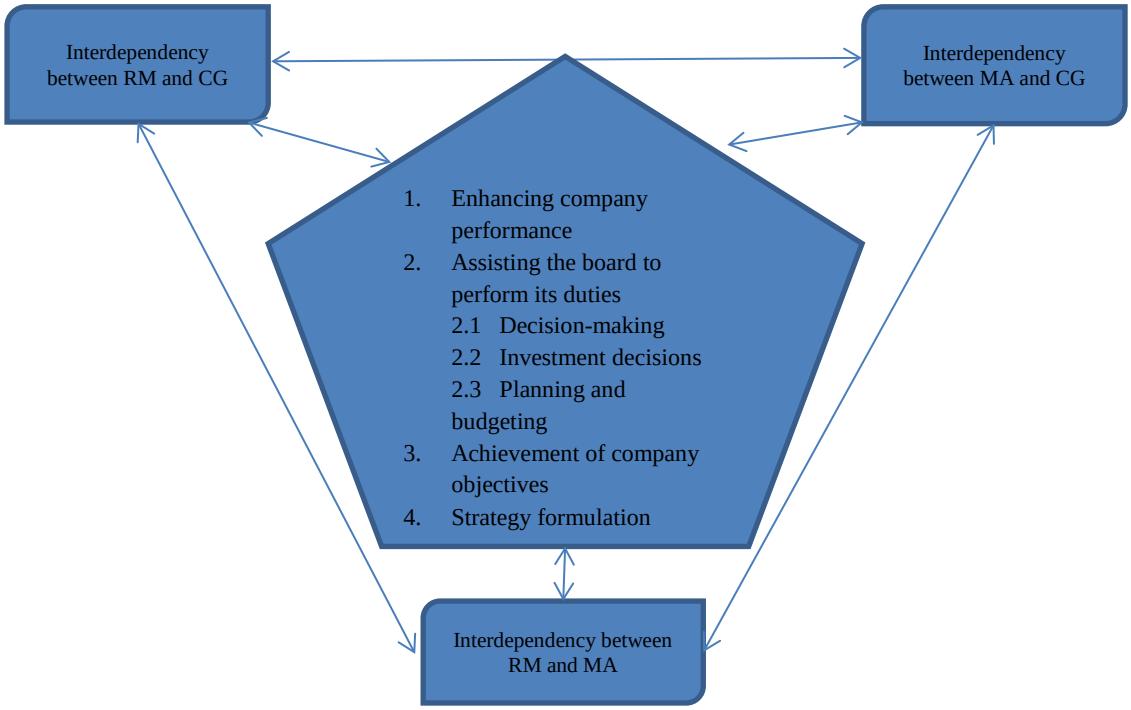


Figure 12: Triangle side-to-side interrelationship of RM, CG and MA

Discussion and Conclusion

Almost all respondents, that is, 96.2 per cent (n=50) indicated that their companies used the ERM approach, whilst only 3.8 per cent (n=2) did not. It can be concluded that the majority of the companies are using the ERM approach in RM. This is consistent with the literature (Brown, Steen and Foreman 2009), which states that the ERM framework is used as a mechanism for group-wide RM strategy and, therefore, contributes to the achievement of company objectives.

The results showed that a large percentage of respondents (75% and above) confirm that, to a large extent, there is interdependence between CG and RM. The results confirm that there is interdependence of CG and RM in assisting the board to perform its duties (84% of the respondents), in achievement of company objectives (75% of the respondents) and in enhancing company performance (73.1% of the respondents). This result is consistent with the studies of Gordon, Loeb, and Tseng (2009), Hoyt and Liebenberg (2011), Manab, Kassim and Hussin (2010), Saltaji (2013) and Taraf (2012), who concluded that there is interdependence of CG and RM.

In their studies, Ehrhardt and Brigham (2009) and Lay and Jusoh (2013) concluded that MA tools are critical for assisting the board to achieve its duties and strategy formulation. The results of the study were also in agreement with this correlation to a limited extent, however, as some of the respondents indicated that the MA tools are not always used. This is, to a degree, in contrast with the literature as not all the companies consider the MA tools important in strategy formulation and assisting the board to achieve its duties. Ehrhardt and Brigham (2009) posit that MA information systems connect the strategic goals of the company with performance. As such, the results also show a stronger correlation between MA and CG in the enhancement of company performance.

It was noted that although the results show the interdependence of MA and GC, there was not an overall majority as 35 per cent of the respondents indicated that they sometimes use MA tools, but not all the time. This confirms the argument of Alam and Ratnatunga (2011), Bhimani (2009) and Mayanja (2010) that the interdependence between CG and MG has not increased to the level at it is supposed to be.

Less than 60 per cent of the respondents agreed that there is interdependence between RM and MA to a large extent, namely, decision-making (57.7%), and planning and budgeting (56.8%). However, it was observed that only 48 per cent agreed that there is interdependence between RM and MA in enhancing company performance. This is partly in agreement with the literature (Du Toit et al. 2010; Rasid and Rahman, 2009; Van der Stede, 2011). Mustapha and Ghani (2013) assert that there is a correlation between CG and MA in enhancing company performance, hence, the results are slightly in contrast.

The results demonstrate that MA, CG and RM are intertwined, which is in line with researchers such as Bhimani (2009), Dean (2010), and Soin and Collier's (2013) arguments. The correlation seems to be stronger between CG and RM. However, the correlation seems to be moderate between RM and MA and strong or moderate between MA and GC. It can be concluded that the results agree with the literature, hence, moderate correlation suggest that the association is somehow not strongly visible.

The results of the study find triangle side-to-side interdependence of RM, CG and MA in assisting the board in the performance of its duties; decision-making; investment decisions; and planning and budgeting. Achievement of company objectives and strategy formulation followed a similar pattern. The actual results did not find a negative correlation amongst the three variables. The findings of the study answered the questions that were asked at the beginning of the research that there is interdependence between the three variables. The results confirm the paradigm of side-to-side interdependence of RM, CG and MA.

Recommendations and Future Studies

MA is viewed as the lifeblood of a company, however, transparency, in terms of sharing information that can be useful in smoothly governing a company, can be questionable. This is evident in the fact that the results showed that some of the companies do not always use the MA tools in RM for governance purposes, although a high percentage agreed to always use MA reports. Furthermore, the fact that companies like Enron, among others, have collapsed, although they were presenting stakeholders with healthy looking financial information, which was inaccurate, is of a concern. The inference was made that the 2007/2008 global financial crisis was due to poor CG and inefficiencies in RM. Shareholders need to be well informed about what is going on in a company given that shared vision is essential regarding the interconnected notion of RM and shareholders' value. Therefore, it is recommended that non-executive members be actively involved, to a limited extent, in some of the key processes in the business, including the appointment of significant people in the company rather than leaving the governing of operations exclusively to the CEO and CFO who, in most cases, form part of the board as executive members. MA may need to be considered essential as a measurement for RM and maybe considered to be mandatory in organisational governance.

The requirements of the Companies Act of 2008 and the King III report are not aligned with the roles of the board of directors, and this creates disharmony. Furthermore, there are some instances in the King III report in which companies are either required to comply or explain, therefore creating inconsistency. Perhaps CG should be made an Act in South Africa rather than just good practice, and incorporate the MA aspect in RM for strengthening CG and to harmonise the inconsistency.

Further studies covering the RM aspects of fraud, stakeholders' management and the areas of compliance that have not been covered in this study. These areas are important as they affect the core of the business, as the falsification of information can have a seriously negative impact on an entity.

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