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An analysis of the effect of enterprise risk management maturity on shareholder value during the economic downturn of 2008-2010

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A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Business Administration.

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ABSTRACT

This research studies the effect of enterprise risk management (ERM) on financial indicators that effect the shareholder value of Johannesburg Stock Exchange (JSE) listed companies during the economic downturn of 2008 – 2010.

Enterprise risk management is the organisational process of identifying risks that affect the company's ability to achieve its objectives; the financial indicators that effect shareholder value include the publicly traded share price, the dividends paid out to shareholders, the volatility of the share price, earnings and the price to earnings (P/E) ratio of the organisation.

The research data was gathered utilising an enterprise risk management maturity survey and publicly available company financial data.

The data was analysed for correlations between the ERM principles and the financial data; the outcome shows that a correlation exists between a single ERM principle (risk architecture) and Shareholder value when an economic downturn occurs.

This indicates that the structure of an organisation's enterprise risk management process is the best indicator of shareholder value protection when and economic downturn occurs, and is more significant than the way an organisation executes its risk strategy or manages its risk protocols.

KEYWORDS

Enterprise Risk Management, Shareholder Value.

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

_____ 9th November 2011

PHILIP TILLMAN DATE

ACKNOWLEDGEMENTS

"True happiness consists not in the multitude of friends, but in their worth and choice."

Samuel Johnston. (1709 - 1784) British lexicographer.

I consider my MBA to be an education far beyond that provided in the classroom, and for that I thank those who I am now privileged to call friends Nicky, Andrew and Jonno. Without their counsel, patience and generosity, for which I am eternally grateful, my life would be in a very different place.

"It is not so much our friends' help that helps us as the confident knowledge that they will help us."

- Epicurus (341 - 270 BC) Greek philosopher.

I would also like to thank Johan Lambrecht, whose supervision was excellent and always made himself available to assist me.

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1.1 Research Title

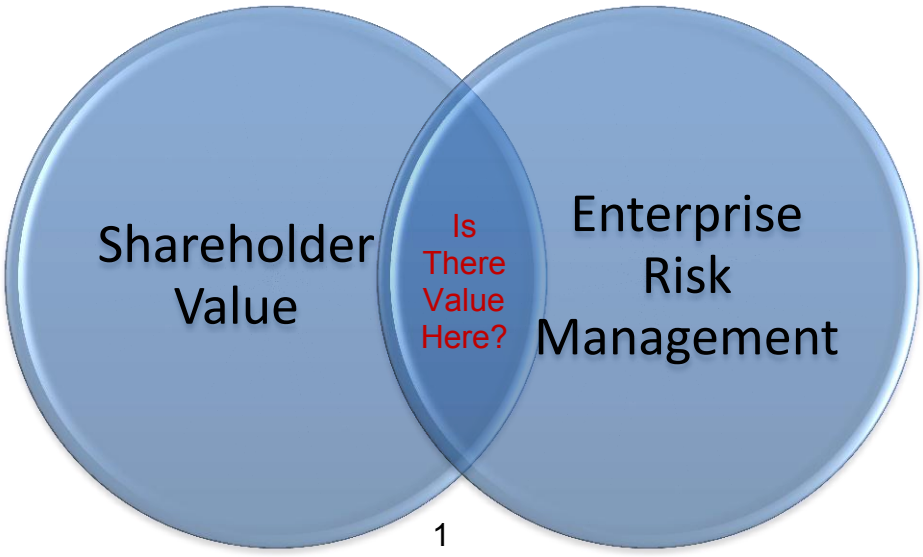
An analysis of the effect of Enterprise Risk Management Maturity on Shareholder Value during the economic downturn of 2008 to 2010.

1.2 Research Purpose and Motivation

The purpose of this research is to measure the levels of Enterprise Risk Management Maturity at a sample of Enterprise organisations listed on the Johannesburg Stock Exchange, and analyse if a correlation exists with the impact on shareholder value in the economic downturn of 2008 – 2010.

The proponents of Enterprise Risk Management would argue that if applied well, to a high level of maturity, it will shield the company and its shareholders from the worst effects of a turbulent market, and therefore perform better in terms of shareholder value compared to the average of other companies. In short, they believe that company value is positively influenced by the use of Enterprise Risk Management.

Figure 1: The Research Question in Graphical Format



This research is highly relevant to both the practising business community and the academic community on the grounds that:

- ERM is an emerging practise
- KING III requires ERM practices to be in place
- ERM can add value to shareholders as highlighted in chapter 2
- Academic teaching offer little by way of ERM teaching
- Risk is currently seen as the avoidance of the downside, as opposed to also including the potential of the upside
- South Africa is currently a global leader in governance and risk practises, this offers an opportunity to demonstrate that South African practises are globally applicable

“As a result of the highly publicised business failures, scandals, and frauds over the past several years, senior managers must now comply with a series of laws, regulations, and listing standards calling for strengthened corporate governance and risk management” (Ballou & Heitger, 2005, p. 1). Governance is a term that is extremely broad and has many sub-sections or components to it.

The strategy of an organisation defines its objectives and the direction of its resources; Enterprise Risk Management (ERM) forms a critical part of planning and strategizing in that it sub-ordinates itself to the objectives of the organisation and ensures that there is sufficient awareness, at multiple layers of the organisation, with regards to the risks involved in the implementation of the objectives within a given context.

Commercial organisations exist to, among other reasons, return value to the shareholder; whether explicitly mentioned in an organisations strategy documents or whether implicitly assumed, shareholder return is one of every commercial organisation's objectives.

Enterprise Risk Management is concerned with the organisational wide risks that can materially affect the objectives of an organisation; it is therefore less focussed at a risk that exists in a stand-alone context (silo based approach) but rather the risks that are either significantly common or material to affect the organisation holistically. Operational Risk Management is focussed at the lower level risks that are less material and more unique.

Enterprise Risk Management relies heavily on the systems and processes within an organisation to identify and manage risks utilising the existing resources of the organisation; this places emphasis on organisational maturity which is effectively measuring whether these systems are in place. This research is to search for any relationship between such systemic maturity and shareholder value; the basis of Enterprise Risk Management is that if limited to silo-based risk management, companies will not prevent the strategic and operational blunders that were seen to impact shareholder value in the economic downturn.

Organisations invest significant time, capital and faith in the process of identifying risks that an organisation faces and mitigating these risks within the risk appetite of the organisation. Their motivation for this investment is that prior knowledge of the exposure any organisation has to the unknown effects of its external environment will result in a lower probability of negative impacts on the organisation, as well maximising positive impacts.

This research is looking for any correlation between the maturity of an organisation's Enterprise Risk Management process and the return provided to the shareholders during a recessionary period compared with previous returns of the same companies.

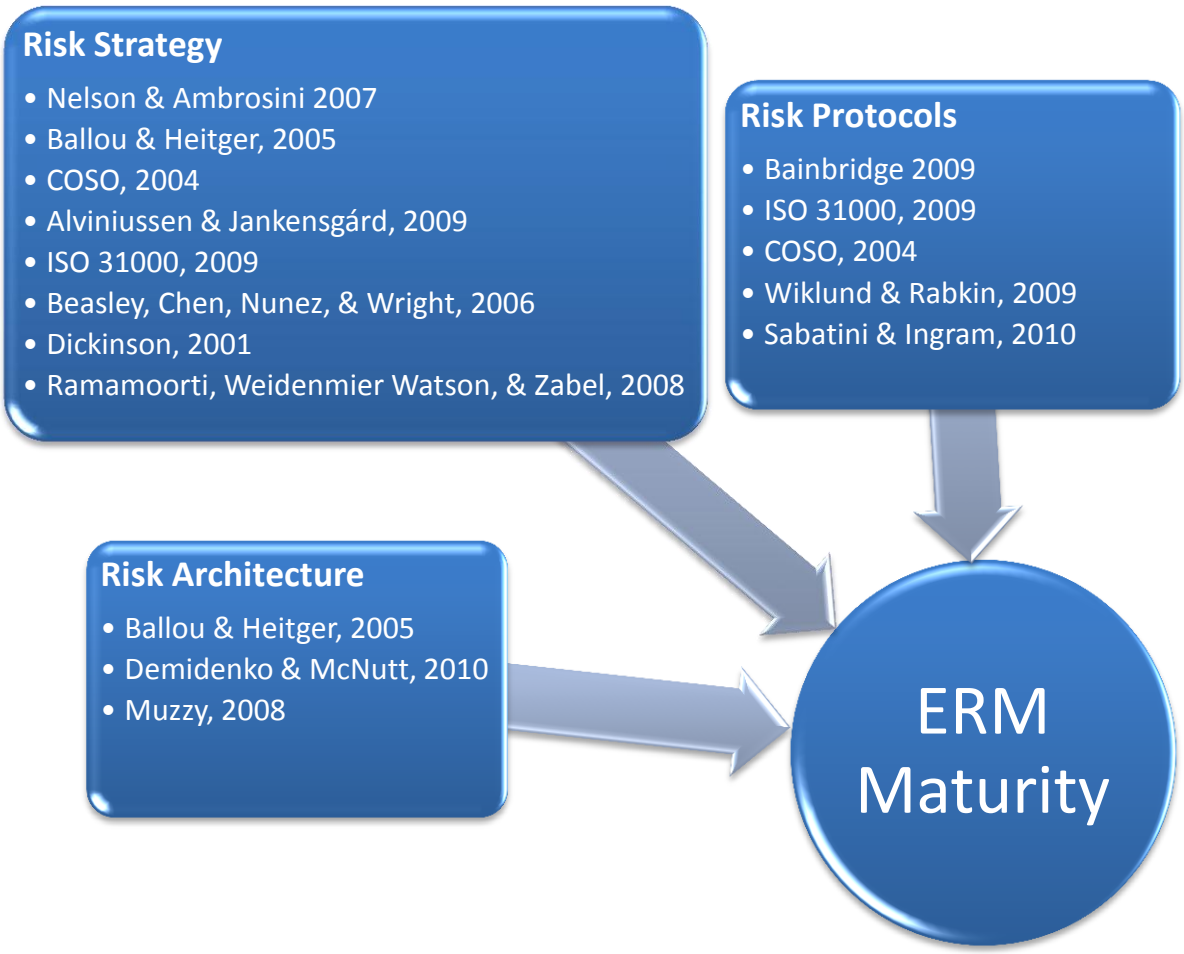
The research seeks to utilise previous research conducted in the area of Enterprise Risk Management, in order to establish if a correlation exists.

Previous research in this field is limited, since Enterprise Risk Management is a relatively new phenomenon for organisations having come to prominence only in the last decade. Previous research limits itself mainly to the description, definition and application of Enterprise Risk Management but little has been study has been done on the outcomes of its implementation.

2. Theory and Literature Review

Enterprise Risk Management can be measured such that an organisation's maturity can be analysed (Shimpi, 2010; McDonald, 2010; ISO 31000, 2009; COSO, 2004; Bainbridge, 2009; Beasley, Pagach, & Warr, 2008). The literature review will show that Enterprise Risk Management can be sub-divided into Risk Architecture, Risk Strategy and Risk Protocols; in Figure 1 below the literature supports this as follows:

Figure 2: Literature Review Structure



2.1 Introduction to Risk

The concept of a Risk is neither new nor revolutionary; it is part of everyday activities both in and out of business; however Risk Management and Enterprise Risk Management are not the same thing. The difference is not simply one of singular vs plural; it is more akin to unique vs aggregate. Risk Management is concerned with the management of individual risks that may appear anywhere in an organisation; Enterprise Risk Management is concerned with risks that appear everywhere in the organisation and have material impact to the objectives of the organisation. Enterprise Risk Management has evolved from the management of risk within an organisation's lower level – the silo - such as a business unit or a division, to the comprehensive management of risk utilising an integrated approach with common factors to ensure global applicability. Some organisations refer to Enterprise Risk Management (ERM) as Integrated Risk Management (IRM).

Ballou & Heitger (2005, p. 2) argue that the responsibility of overseeing risk management falls on the board of directors, while the ownership responsibility for Enterprise Risk Management falls on the CEO and senior executives.

Risks may exist at any operational or business levels of an organisation which require management; such contexts would include health and safety, local competition and suppliers. This is quite separate to the concept of an Enterprise Risk which spans a global enterprise and is materially relevant to the CEO, as well as forming part of strategy implementation.

Most businesses are no longer owned by wealthy families, but rather by pension and investment funds for which the beneficiary is every person with a pension or an investment-backed life insurance policy. This demands a greater level of governance in order to protect the shareholders from unwarranted risks.

“ERM can reassure the principal that their interests are being met through the diligent and efficient behaviour of the agent.” (Demidenko & McNutt, 2010, p. 803)

“Events at Worldcom Inc., Enron Corp. and others have helped shape a desire for a more comprehensive and integrated view of risk. Boards, audit committees and executives at these and other companies received reports with conflicting information.” (Muzzy, 2008)

2.1.1 Risk

ISO 31000 (2009) defines a risk as “The effect of uncertainty on Objectives” and implies that a risk can be positive or negative in nature (ie. an upside risk or a downside risk). Put another way, “risk management is the process by which business organizations proactively determine the types and levels of risk appropriate for achieving the organization‘s strategic goals.” (Bainbridge, 2009, p. 968).

“Organizations of all types and sizes face internal and external factors and influences that make it uncertain whether and when they will achieve their objectives. The effect this uncertainty has upon an organization's objectives is “risk”.” (ISO 31000, 2009)

2.1.2 Enterprise Risk Management

Enterprise Risk Management is the practise of viewing an organisation's exposure from the point-of-view of the board and senior executives, in a manner that is common and materially adjusted to the perspective of the audience.

Nelson & Ambrosini (2007, p. 25) explain what Enterprise Risk Management is not; "it is not a tool; it is not a onetime project; and, most of all, it is not an end state", they argue that import questions are answered only by an ERM framework supported by various tools and methods.

"ERM is about taking a holistic, company-wide approach to managing a company's risks, and aggregating information centrally in the organization regarding various different risk exposures." (Alviniussen & Jankensgård, 2009, p. 178)

"Enterprise Risk Management is a process, affected by an entity's board of directors, management, and other personnel, applied in a strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risks to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives." (Ballou & Heitger, 2005, p. 2).

"In other words, ERM generally provides a view of the harm that can happen to a firm" (Wiklund & Rabkin, 2009, p. 55).

Enterprise Risk, as its name implies, encapsulates all varieties of risk across the organisation and enables the aggregation of these risks based on their materiality to the organisation as a whole.

All relevant risks which have an impact on the future cash flow, profitability and continued existence of a company may be described as its Risk Universe. (Alviniussen & Jankensgård, 2009, p. 178)

2.1.3 The Enterprise Risk Management Process

Enterprise Risk Management is a process of "on-going and flowing through an entity effected by people at every level of an organization, applied in strategy setting, applied across the enterprise at every level and unit, designed to identify potential events that, if they occur, will affect the entity and to manage risk within its risk appetite, able to provide reasonable assurance to an entity's management and board of directors, and geared to achievement of objectives in one or more separate but overlapping categories" (COSO, 2004, p. 2).

The process of Enterprise Risk Management should be in integral part of standard management practises, specific to the nature of the organisation that it is serving and become mature enough to be culturally embedded (ISO 31000, 2009, p. 13).

Figure 4 and Figure 4 show the COSO (2004) and ISO 31000 (2009) models of Enterprise Risk Management

Figure 3: The COSO Enterprise Risk Management Cube (COSO, 2004)

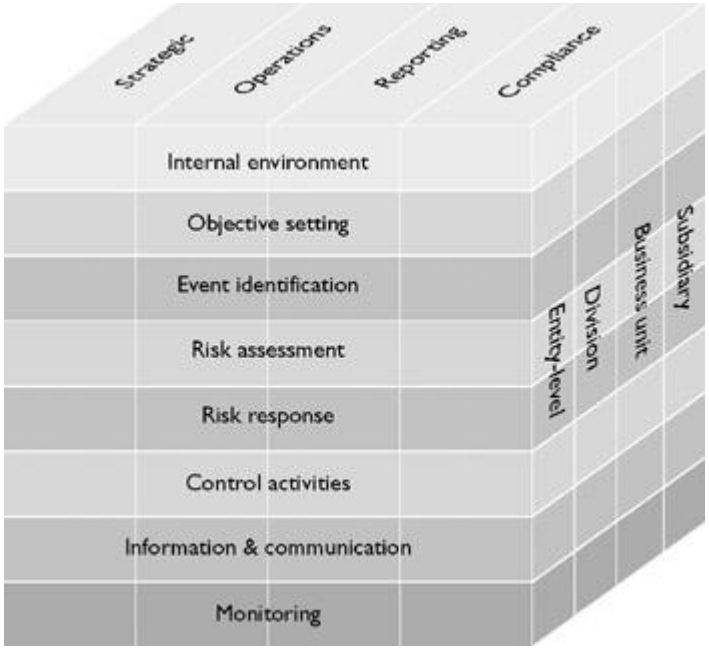
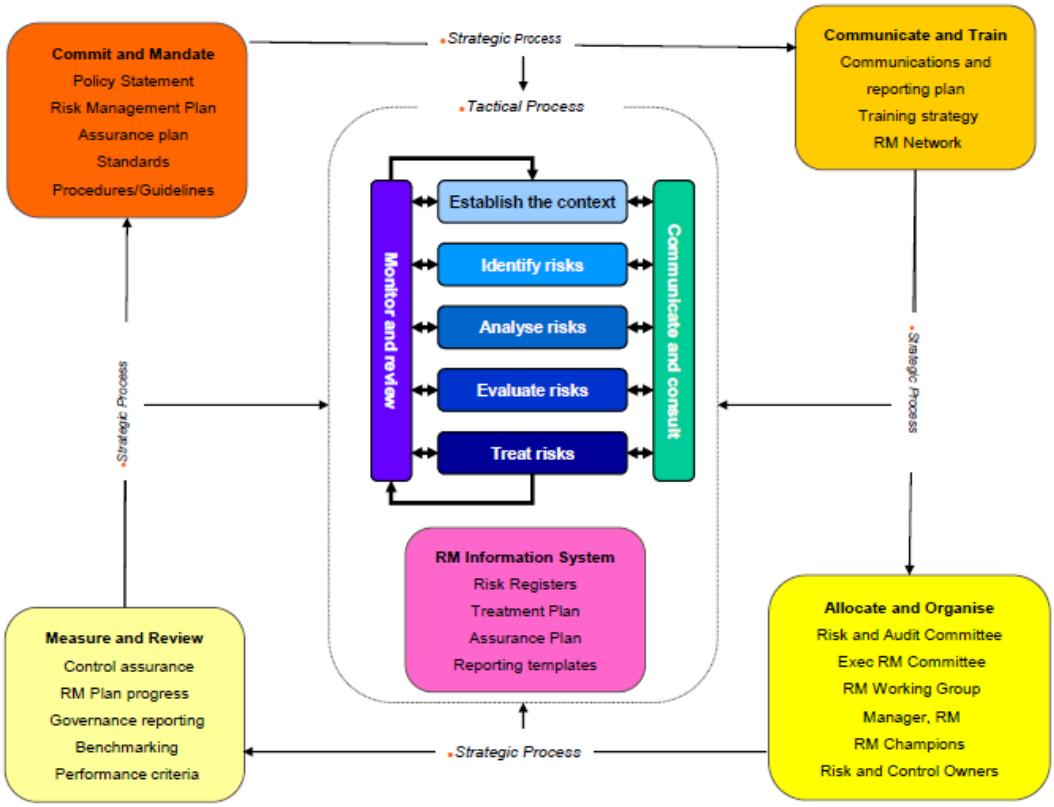


Figure 4: Enterprise Risk Management Process (ISO 31000, 2009)



2.1.3.1 Establishing Context

A risk assessment should be done within a context; examples of such contexts would include strategic risk assessments, operational risk assessments and process risk assessment. The setting of context "articulates its objectives, defines the external and internal parameters to be taken into account when managing risk, and sets the scope and risk criteria for the remaining process" (ISO 31000, 2009, p. 15).

2.1.3.2 Risk Identification

Enterprise Risk Management is a process that includes all level of the organisation. "The organization should identify sources of risk, areas of impacts, events (including changes in circumstances) and their causes and their potential consequences" (ISO 31000, 2009, p. 17).

The management of an organisation are those in possession of the processes and procedures for each division/operation/entity. With ownership comes responsibility. Therefore, risk Identification can only be conducted with management in order to ensure the maximum number and quality of risks are identified and detailed.

This supports the argument of Ballou & Heitger (2005) that Enterprise Risk Management is a function of management and not the responsibility of the board.

2.1.3.3 Analyse Risks

An understanding of the causes and consequences of a risk, together with which objectives to which this risk is aligned, are all important factors when analysing a risk.

“The purpose of risk analysis is to comprehend the surrounding factors of a risk such as where it’s realisation would impact. Risk analysis provides an input to risk evaluation and to decisions on whether risks need to be treated” (ISO 31000, 2009, p. 18).

“Risks are analysed, considering likelihood and impact, as a basis for determining how they should be managed. Risks are assessed on an inherent and a residual basis” (COSO, 2004, p. 4).

2.1.3.4 Evaluate Risks

“The purpose of risk evaluation is to assist in making decisions, based on the outcomes of risk analysis, about which risks need treatment and the priority for treatment implementation” (ISO 31000, 2009, p. 18). Risk evaluation is therefore a process of prioritisation; this is conducted in either quantitative or qualitative methods, or sometimes both. The risk is evaluated on the probability (likelihood) and the impact (consequence) of the risk materialising in a given context; through this evaluation, a two dimensional matrix can be produced that enables prioritisation.

COSO (2004) refers to the Risk Response as “ Management selects risk responses – avoiding, accepting, reducing, or sharing risk – developing a set of actions to align risks with the entity’s risk tolerances and risk appetite” (COSO, 2004, p. 4).

The result of the evaluation is a management decision on how to react to the level of the risk; the options (referred to as the Four T's) are:

I. **Tolerate** – Accept the level of the risk in its current form, because the risk rating is either immaterial or the cost of treating the risk would be too high;

II. **Treat** – Apply a number of risk treatments in order to reduce the probability or impact, and the subsequent risk rating, of the risk;

III. **Transfer** – Pass the part or all of the consequence to another party, this would typically be through insurance;

IV. **Terminate** – The risk is too high to continue the activity that causes the risk, therefore terminating the activity removes the risk from the organisation completely.

Bainbridge (2009, p9.70) concurs with this and argues that "the tools for managing these risks ex ante include (1) avoiding risk by choosing to refrain from certain business activities, (2) transferring risk to third parties through hedging and insurance, (3) mitigating operational risk through preventive and responsive control measures, and (4) accepting that certain risks are necessary to generate the appropriate level of return."

2.1.3.5 Treat Risks

Having evaluated and analysed a risk, the organisation will have a clear understanding of all aspects related to it and therefore sufficient information to decide on the measures to treat the risk (sometimes referred to as controls or mitigation); COSO (2004) refers to these as Control Activities – "Policies and procedures are established and implemented to help ensure

the risk responses are effectively carried out" (COSO, 2004, p. 4). The purpose of treatments is to reduce the risk to the organisation while continuing the activity that causes the risk. Examples of this might include credit checking in the financial services industry or safety training in the mining industry.

2.1.3.6 Monitor and Review

"The entirety of enterprise risk management is monitored and modifications made as necessary. Monitoring is accomplished through on-going management activities, separate evaluations, or both" (COSO, 2004, p. 4). Assurance needs to be provided to the board that the organisation is sufficiently managing it's risk profile so as to be within the tolerance levels of the board's risk appetite; this requires regular monitoring and auditing in order for assurance to be independent.

"The results can be incorporated into the organization's overall performance management, measurement and external and internal reporting activities" (ISO 31000, 2009, p. 20).

2.1.3.7 Communicate and Consult

Effective communication also occurs in a broader sense, flowing down, across, and up the entity" (COSO, 2004, p. 4). Enterprise Risk Management is a continuous process, not a single static point-in-time view of an organisations exposure; while a risk may be a constant item, influences on the risk and the effect of a risk materialising, are constantly in flux based on many variables. The only people with sufficient knowledge or understanding

of these variables are the management within the business; this results in a constant process of communicating vertically and laterally as to risks, and reviewing risk levels.

It follows that “Communication and consultation with external and internal stakeholders should take place during all stages of the risk management” (ISO 31000, 2009, p. 14)

2.1.4 Materiality

Materiality is also a concept that allows for prioritisation; it is a filter that ensures focus is directed at the most (highest) material risks. A risk that is material for a division may be immaterial for the group head office; this does not mean it should not be managed at a division, indeed it should, but only the highest risk items would aggregate to the Group risk profile. This can only be achieved if Enterprise Risk Management is embedded at all levels of the organisation, and is one of the differentiators between Risk Management and Enterprise Risk Management. Materiality is only relevant to certain financial risks; a reputational risk, for example, has equal impact wherever it occurs, but a financial risk has innate qualities that allow for material aggregation.

2.1.5 Risk Realisation

An organisation will have many risks identified at numerous organisational levels, the rating of which will have been analysed, evaluated and treated. External and internal factors may occur that cause a risk to materialise causing an impact to the organisation. “Risk events also commonly

correlate, producing a snowball effect on financial and reputation damage." (Muzzy, 2008); this implies that the realisation of a single risk can cause control failure in other risks and cause damage to the organisations objectives. This is further supported by Wiklund & Rabkin (2009, p. 55) who state that: "Any potential event will impact firm resources and one or more business objectives. The financial impact will cascade through financial statements — whether balance sheet, income statements, statement of cash flows or shareholder equity statement — to the detriment of the firm."

2.1.6 Risk Maturity Management

Only 7 percent of risk managers rate themselves at an "advanced" level in terms of implementing their enterprise risk management programs, while over one-third are really just getting started in ERM, a survey by Aon revealed. (McDonald, 2010, p. 25)

The effectiveness of Risk Management, therefore, is closely connected with both the integrity and the ethical values of senior management who set the "tone at the top". (Demidenko & McNutt, 2010, p. 803)

"Among the many lessons to be learned, one is immediately clear: The subprime debacle represents a failure in risk management, rather than a failure of risk management" (Shimpi, 2010, p. 22), this implies that the maturity of a risk program is critical to it's success.

McDonald (2010, p.25) further states that the in the Aon Survey data identified nine hallmarks of top-performing ERM programs:

- Board-level commitment to ERM is a critical framework for successful decision making and driving value.

- A dedicated risk executive in a senior level position, driving and facilitating the ERM process.
- An ERM culture that encourages full engagement and accountability at all levels of the organization.
- Engagement of stakeholders in risk management strategy development and policy setting.
- Transparency of risk communication.
- Integration of financial and operational risk information into decision-making.
- Use of sophisticated quantification methods to understand risk and demonstrate added value through risk management.
- Identification of new and emerging risks using internal data as well as information from external providers.
- A move from focusing on risk avoidance and mitigation to leveraging risk and risk management options that extract value. (McDonald, 2010, p. 25)

One way to classify approaches to corporate risk management is according to whether risks are aggregated and managed centrally in the organization, or whether they are managed independently of each other. “The latter is usually referred to as the "Silo Approach", whereas the former is referred to as Enterprise Risk Management” (Alviniussen & Jankensgård, 2009, p. 187).

The above hallmarks, together with other principles identified from the final literature review, will form the basis for the surveys of organisational Enterprise Risk Management Maturity.

2.1.7 Enterprise Risk Management and Strategy Alignment

"Value is maximized when management sets strategy and objectives to strike an optimal balance between growth and return goals and related risks, and efficiently and effectively deploys resources in pursuit of the entity's objectives" (COSO, 2004, p. 1).

"It is important to note that the Total Risk profile of a company is highly related to and a function of corporate policies and strategic decisions" (Alviniussen & Jankensgård, 2009, p. 179).

Given that the definition of a risk links uncertainty and objectives, it is logical that Enterprise Risk Management should be part of the strategy and objective planning process.

"There is a direct relationship between objectives, which are what an entity strives to achieve, and enterprise risk management components, which represent what is needed to achieve them" (COSO, 2004, p. 4).

As an organisation defines its objectives, it will also define the level of risk it is prepared to take in order undertake the activity that achieves the objective; this is the risk appetite. "Defining its risk appetite and ensuring that it is aligned with the organization's objectives and strategies are also part of the objective-setting component." (Ballou & Heitger, 2005, p. 7)

The desired profitability, the dividend return and the share price are all objectives; this means that an organization should foster open and

transparent dialogue with its shareholders because risk/return preferences should be agreed upon by all. (Ballou & Heitger, 2005, p. 7).

Part of the strategic planning process is the balanced scorecard which is a commonly utilised performance management system which links strategy and mission to performance measures and strategically aligned initiatives (Beasley, Chen, Nunez, & Wright, 2006, p. 50). “Because balanced scorecards take an enterprise-wide approach, it provides an excellent platform that can easily be enhanced to focus on risk management as part of performance measurement evaluations.” (Beasley, Chen, Nunez, & Wright, 2006, p. 50).

Insufficient value was previously placed upon shareholder value models in strategic planning, “Modern strategic planning models are based more on shareholder value concepts” (Dickinson, 2001, p. 360).

2.1.8 ERM and Financial Planning/Structure

Enterprise Risk Management allows for organisations to plan their financial strategy within the organisations risk framework and appetite; “When looking at ERM through a balance- sheet perspective, among the factors to consider are assets, liabilities and shareholder equity” (Wiklund & Rabkin, 2009, p. 55); including Enterprise Risk Management into financial planning is referred to as Enterprise Risk Budgeting.

Hitherto, financial institutions in particular were vulnerable to uncertainties because of the risks they took with regards to their balance sheet positions, while other organisations and industries were less vulnerable to, and hence less impacted by, the financial turbulence of 2008 and 2009. For these

organisations, Sabatini & Ingram (2010, p. 61) suggest that other industries fared better because “it’s a reflection of the effectiveness of risk management practices such as hedging and integrating ERM into their corporate culture. (Sabatini & Ingram, 2010, p. 61)

2.2 Enterprise Risk Management and Shareholder Value

2.2.1 The financial crisis period of 2008 – 2010

While debate still rages as to the amplifying causes of the 2008 financial crisis, systemic failures of Enterprise Risk Management are evident through the snowball effect even of those outside the financial services industry, where the crisis began. “Shareholder losses attributable to absent or poorly implemented risk management programs likely are enormous.” (Bainbridge, 2009, p. 967)

Silo approaches were and still are utilised in many organisations, thus preventing a true enterprise-wide view of organisational exposure. “This sizeable group of firms thus failed to adopt an enterprise management approach in which all risk areas were brought into a single, integrated, firm-wide process.” (Bainbridge, 2009, p. 971). Other firms were grossly exposed in that that: “At some firms, the problem was the absence of any system for managing risk. According to a 2002 survey of corporate directors, 43% said that their boards had either an ineffective risk management process or no process for identifying and managing risk at all.” (Bainbridge, 2009, p. 970)

The above argues when some organisations managed their risk in silos, it leaves room for strategic and operational blunders; these blunders should be risk treated through an Enterprise Risk Management process but are instead neglected and therefore result in exposure. “According to a 2005

survey by management consulting firm Booz Allen, 87 percent of the market value lost by large companies with market capitalizations over US $1 billion was the result of strategic and operational blunders. Compliance failure, typically the focus of downside risk, destroyed only 13 percent of market value during the five-year study" (Ramamoorti, Weidenmier Watson, & Zabel, 2008, p. 53).

2.2.2 Risk taking and shareholder return

Every business accepts risk in order to achieve financial goals; the fact that a risk can be reduced does not necessitate the need to do so. "As the firm's residual claimants, shareholders do not get a return on their investment until all other claims on the corporation have been satisfied. All else equal, shareholders therefore prefer high return projects. Because risk and return are directly proportional, however, implementing that preference necessarily entails choosing risky projects" (Bainbridge, 2009, p. 982).

An interesting study, although not covered by this research, would be shareholders opinions as to the benefit of Enterprise Risk Management in both recessionary and growth markets. "Proponents of ERM claim that ERM is designed to enhance shareholder value; however, portfolio theory suggests that costly ERM implementation would be unwelcome by shareholders who can use less costly diversification to eliminate idiosyncratic risk." (Beasley, Pagach, & Warr, 2008)

Shareholder return, driven by profits in the form of dividends, as well as share price in the terms of future earnings expectations, can be equally

affected by unexpected costs. The goal of Enterprise Risk Management is therefore also the avoidance of financial distress which Alviniussen & Jankensgård (2009, p. 179) state “entails various costly consequences and that any value from a risk management effort largely comes from avoiding such costs ("Corporate Risk Theory").

This is supported by Gordon, Loeb & Chih-Yang (2009, p. 301) who state “there is growing support for the general argument that organizations will improve their performance by employing the ERM concept.”

Gordon, Loeb & Chih-Yang (2009) argue that a match between Enterprise Risk Management and five factors affect the relationship between performance and Enterprise Risk Management; these being industry competition, firm complexity, environmental uncertainty, firm size and board of directors monitoring. This implies that the theory of Enterprise Risk Management improving performance is not a one size fits all principle; rather its value is dependent upon various organisation specific factors. This is supported by Beasley, Pagach & Warr (2008) who argue that the reasons ERM may increase or decrease shareholder value are based upon individual firm characteristics and this ruling out a definitive statement about benefits or costs of Enterprise Risk Management.

Hoyt, Moore & Liebenberg (2008) found a positive relation between firm value and the use of ERM to the amount of 17 percent of firm value.

2.2.3 The cost of Enterprise Risk Management

Enterprise Risk Management is not without its own cost for implementation, and it must therefore add value to an organisation. An ERM program whose cost is materially insignificant, but decreases earnings variability, would be beneficial (Beasley, Pagach & Warr, 2008), but individual firm characteristics may minimise the benefits of Enterprise Risk Management on shareholder value; in such situations risks would be tolerated.

2.3 The gap in current literature

There is currently very little literature on Enterprise Risk Management as a method of corporate governance. Much of the literature focuses on Risk Management as a method of credit lending and as such is not relevant to the Enterprise Risk Management field.

Any research that has been done is very theoretical in nature and talks of the likely impact of Enterprise Risk Management on the organisation and upon its shareholders.

This research report is therefore ground breaking in its attempt to establish a relationship between Enterprise Risk Management and the protection that it may provide to shareholders when an economic downturn occurs.

3. Research Proposition

The review of literature in chapter 2 shows that the effects of enterprise risk management on shareholder value are not well understood. The literature indicates an expectation of positive correlation and the six propositions in this Chapter seek to holistically examine this question.

3.1 Proposition 1

There is a positive correlation between organisations with mature ERM programs and shareholder value in an economic downturn.

The prevalence of enterprise risk management, and its recommendation in KING III, implies that shareholders are best represented when enterprise risk management is practised (Alviniussen & Jankensgård, 2009; Ballou & Heitger, 2005; Beasley, Chen, Nunez, & Wright, 2006; Wiklund & Rabkin, 2009; Sabatini & Ingram, 2010).

This proposition is holistic in that it will be a combination of Propositions 2, 3 & 4.

Hypothesis

H_0 = A positive correlation exists between the maturity of organisations' ERM programs and their shareholder value in an economic downturn

H_1 = No correlation exists between the maturity of organisations' ERM programs and their shareholder value in an economic downturn

3.2 Proposition 2

There is a positive correlation between organisations with mature ERM programs and share price volatility in an economic downturn.

This proposition is unique in that it is analysing a real value that is not open to the same level of investor or management manipulation. While share price (proposition 3) is based upon the expectation of future earnings, and dividend (proposition 4) can be provided despite making a loss, volatility is more likely to be influenced by external factors. In more volatile markets investors look for safe havens and well run organisation that are less volatile can represent a safe haven.

Hypothesis

H_0 = A positive correlation exists between the maturity of organisations' ERM programs and their share price volatility in an economic downturn

H_1 = No correlation exists between the maturity of organisations' ERM programs their share price volatility in an economic downturn

3.3 Proposition 3

There is a positive correlation between organisations with mature ERM programs and share price in an economic downturn.

This proposition will test how investors view the future earnings of a company (which drives share price) in line with that company's enterprise risk management maturity, during an economic downturn.

Hypothesis

H_0 = A positive correlation exists between the maturity of organisations' ERM programs and their share price in an economic downturn

H_1 = No correlation exists between the maturity of organisations' ERM programs their share price in an economic downturn

3.4 Proposition 4

There is a correlation between organisations with mature ERM programs and dividend pay-outs in an economic downturn.

This proposition will measure the sustainability of dividend pay-outs during an economic downturn and analyse if enterprise risk management affects these decisions to return money to shareholders.

Hypothesis

H_0 = A positive correlation exists between the maturity of organisations' ERM programs and their dividends in an economic downturn

H_1 = No correlation exists between the maturity of organisations' ERM programs their dividends in an economic downturn

3.5 Proposition 5

There is a correlation between organisations with mature ERM programs and Price to Earnings Ratios (P/E Ratio) in an economic downturn.

This proposition will measure the markets opinion of the future earnings of the organisation (which result in the share price) as compared to the current earnings and see if enterprise risk management affects these ratios.

Hypothesis

H_0 = A positive correlation exists between the maturity of organisations' ERM programs and their P/E ratios in an economic downturn

H_1 = No correlation exists between the maturity of organisations' ERM programs their P/E ratios in an economic downturn

3.6 Proposition 6

There is a correlation between organisations with mature ERM programs and Earnings in an economic downturn.

This proposition will measure the markets opinion of the future earnings of the organisation (which result in the share price) as compared to the current earnings and see if enterprise risk management affects these ratios.

Hypothesis

H_0 = A positive correlation exists between the maturity of organisations' ERM programs and their Earnings in an economic downturn

H_1 = No correlation exists between the maturity of organisations' ERM programs their Earnings in an economic downturn

3.7 Consistency matrix

Table 1: Research Proposition Consistency Matrix

	Research Proposition	Literature	Data	Analysis
1 – ERM & Shareholder Value	H_0 A positive correlation exists between the maturity of organisations' ERM programs and their shareholder value in an economic downturn	Alviniussen & Jankensgård, 2009 Ballou & Heitger, 2005 Beasley, Chen, Nunez, & Wright, 2006 Gordon, Loeb & Chih-Yang (2009) Wiklund & Rabkin, 2009 Sabatini & Ingram, 2010	ERM Maturity Survey Share Price Data	Simple Moving Average of Variations
	H_1 No correlation exists between the maturity of organisations' ERM programs and their shareholder value in an economic downturn			
2 – ERM & Share Price Volatility	H_0 A positive correlation exists between the maturity of organisations' ERM programs and their share price volatility in an economic downturn			
	H_1 No correlation exists between the maturity of organisations' ERM programs their share price volatility in an economic downturn			
3 – ERM & Share Price	H_0 A positive correlation exists between the maturity of organisations' ERM programs and their share price in an economic downturn			
	H_1 No correlation exists between the maturity of organisations' ERM programs their share price in an economic downturn			
4 – ERM & Dividend Yield	H_0 A positive correlation exists between the maturity of organisations' ERM programs and their dividends in an economic downturn			
	H_1 No correlation exists between the maturity of organisations' ERM programs their dividends in an economic downturn			
5 – ERM & P/E Ratio	H_0 A positive correlation exists between the maturity of organisations' ERM programs and their P/E ratios in an economic downturn			
	H_1 No correlation exists between the maturity of organisations' ERM programs their P/E ratios in an economic downturn			
6 – ERM & Earnings	H_0 A positive correlation exists between the maturity of organisations' ERM programs and their Earnings in an economic downturn			
	H_1 No correlation exists between the maturity of organisations' ERM programs their Earnings in an economic downturn			

4. Research Methodology

4.1 Introduction

The research was descriptive quantitative in nature in that it attempts to describe the characteristics of a sample of companies on the Johannesburg Stock Exchange.

4.2 Population of Data and Unit of Analysis

The population of relevance is all Johannesburg Stock Exchange listed companies; this is because they all have multiple shareholders and are obliged to focus on Enterprise Risk Management because of the KING codes that are mandatory to all listed entities.

The unit of analysis is the level of Enterprise Risk Management maturity, which shall be determined through a survey.

4.3 Sampling Method and Sample Size

The table below indicates the aim, collection method, sampling technique and sample size for the research.

Table 2: Sampling Method & Size

Aim	Collection Method	Sampling Technique	Sample Size
Measure ERM maturity	Structured questions based on principles	Survey administered personally	20 – 30 companies

4.4 Data Collection

Data for this research was collected entirely from the McGregorBFA electronic database (Figure 5) which was accessed through the University of Pretoria and GIBS internet portal.

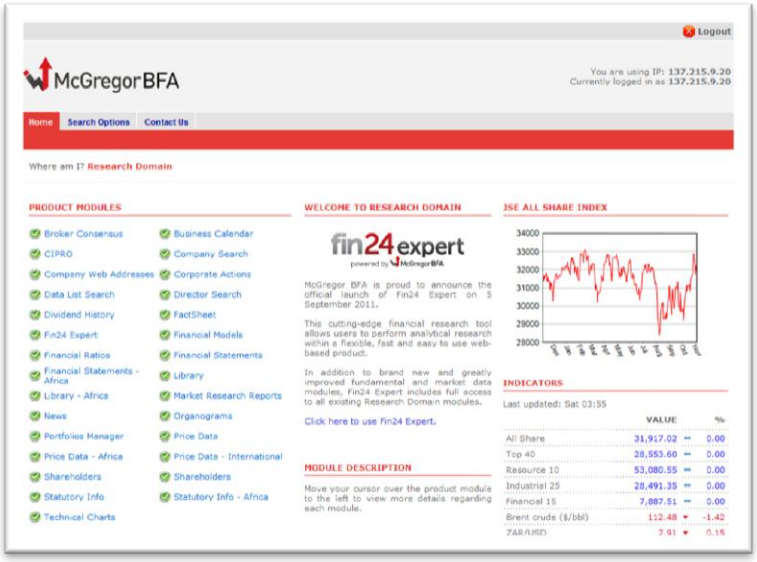


Figure 5: Screenshot of McGregor BFA Portal

Data was collected for each company who completed a Survey as well as for the Top 40 and JSE All Share Indexes.

Table 3: Data Collected For each Respondent

Data Collected	Calculations deduced from the data collected
Share Price (31 December)	• Share price variation • Shareholder return
Price Earnings (P/E) Ratio (31 December)	• P/E variation
Dividend Yield (DY) Percentage (31 December)	• DY variation
Highest Share Price for the full year ending 31 December	• Volatility variation
Lowest Share Price for the full year ending 31 December	• Volatility variation
Earnings for Full Year	• Earnings variation

The data was collected for the full year ending 31 December between 2001 and 2010; this allows for real analysis to occur on year-on-year basis (i.e.

2008 vs. 2009) as well as a simple moving average (SMA) which compares year-on-year to the historical average of the five years prior year being analysed.

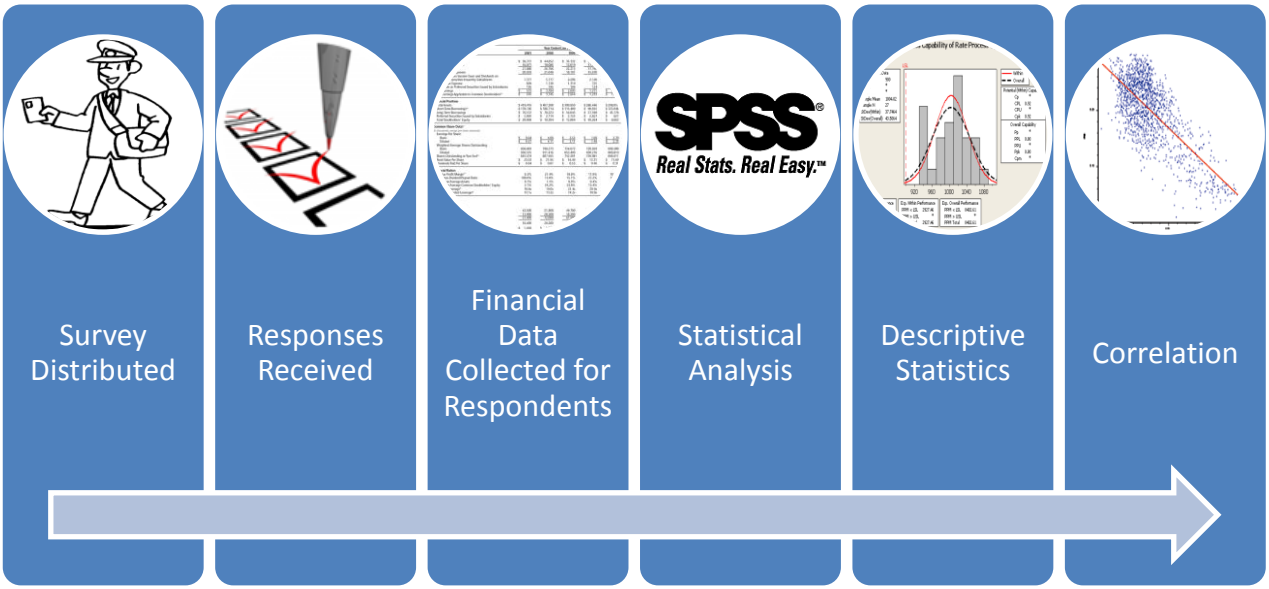
4.5 Data Analysis Approach

The data was analysed and calculations were done that include:

- Share price (SP) variation
- Price/earnings (P/E) ratio variation
- Dividend Yield (DY) variation
- Shareholder return (SR) variation
- Volatility of share price (VOL)
- Earnings (EVAR)

The calculations performed on the collected data are detailed in 4.7 method of data analysis.

Figure 6: Data Collection & Analysis Methodology



4.6 Unit of analysis

In order to analyse the effect that Enterprise Risk Management has upon shareholder value of Johannesburg Stock Exchange listed companies, two sets of have been collected. The first of these was the level of Risk Maturity of each organisation and the second was the historical share price, price/earnings (P/E) ratio and dividend data from the Annual reports.

Once these data sets were collected, they were statistically analysed for correlations; specifically comparing the Enterprise Risk Management maturity holistically against the financial data, as well as on a proposition by proposition basis.

It is important to note that the data with regards to the Enterprise Risk Management maturity is not backwards looking as there is no way of measuring the state of Enterprise Risk Management of each company in the past.

Therefore a bias may exist in favour of organisations that increased their Enterprise Risk Management maturity in the period since the economic downturn until the time of measurement.

Since establishing and implementing an Enterprise Risk Management system is both continuous and long-term, the assumption could be made that these systems have remained largely stable in the last 4 years and therefore any bias is minimal.

4.7 Method of Data Analysis

4.7.1 Enterprise Risk Management Maturity

The measurement of Enterprise Risk Management is based upon a number of principles, each of which has a number of requirements to be achieved. The youthfulness of the ERM profession means there is no standard as to the definition of these principles; the researcher has summarised multiple documents reviewed in the literature to produce the maturity model in Table 4. These principles are:

- **Risk Architecture** which defines the responsibilities, accountabilities and reporting structures for ERM
- **Risk Strategy** which defines the policies, processes, procedures for ERM
- **Risk Protocols** which defines the detail, frequency, contexts, reporting audiences for ERM

Each of the requirements has been translated into a question that measures the maturity of the company for that specific requirement. The maximum score available is 5, and the minimum is 1; there are multiple questions in order to measure the score for each principle. The questions and principles are not weighted on the grounds that any such weighting could bias the outcome.

Table 4: Principles, Requirements and Measurement Questions for enterprise risk management maturity:

Principle	Requirement	Measurement Question
Risk Architecture	Statement produced that sets out risk responsibilities and lists the risk-based matters reserved for the Board	Does the board have defined responsibilities in the Risk Management process
	Risk management responsibilities allocated to an appropriate management committee	Is there a committee dedicated solely to the topic of Risk Management
	Arrangements are in place to ensure the availability of appropriate competent advice on risks and controls	Does the organisation use external experts to advise on risks and controls
	Risk aware culture exists within the organisation and actions are in hand to enhance the level of risk maturity	Is there a process of measuring Risk Maturity across the organisation
	Sources of risk assurance for the Board have been identified and validated	Does the organisation have multiple assurance providers that report to the board
Risk Strategy	Risk management policy produced that describes risk appetite, risk culture and philosophy	Is there a policy that defines the appetite, culture and philosophy or Risk management.
	Key dependencies for success identified, together with the matters that should be avoided	Does the policy include key dependencies for success and matters that should be avoided
	Business objectives validated and the assumptions underpinning those objectives tested	Does the organisation define its Objectives and identify risks in the context of those objectives
	Significant risks faced by the organisation identified, together with the critical controls required	Does the organisation distinguish between a risk and a risk that is materially significant
	Risk management action plan established that includes the use of key risk indicators, as appropriate	Does the organisation identify key risk indicators
	Necessary resources identified and provided to support the risk management activities	Is there a risk management action plan in the organisation

Risk Protocols	Appropriate risk management framework identified and adopted, with modifications as appropriate	Does the organisation have a Risk Management framework
	Suitable and sufficient risk assessments completed and the results recorded in an appropriate manner	Does the organisation conduct regular Risk assessments Does the organisation record these electronically
	Procedures to include risk as part of business decision-making established and implemented	Are Risk assessments utilised as part of the decision making process
	Details of required risk responses recorded, together with arrangements to track risk improvement recommendations	Does the framework include the identification of Risk responses
	Incident reporting procedures established to facilitate identification of risk trends, together with risk escalation procedures	Does the organisation track the incidents where risks are realised
	Business continuity plans and disaster recovery plans established and regularly tested	Does the organisation have DR and BCM plans in place
	Arrangements in place to audit the efficiency and effectiveness of the controls in place for significant risks	Does the organisation audit the efficiency and effectiveness of the controls
	Arrangements in place for mandatory reporting on risk, including reports on at least the following: _ Risk appetite, tolerance and constraints _ Risk architecture and risk escalation procedures _ Risk aware culture currently in place _ Risk assessment arrangements and protocols _ Significant risks and key risk indicators _ Critical controls and control weaknesses _ Sources of assurance available to the Board	How many of the items below are included in mandatory reports to the Board: • Risk appetite, tolerance and constraints • Risk architecture and risk escalation procedures • Risk aware culture currently in place • Risk assessment arrangements and protocols • Significant risks and key risk indicators • Critical controls and control weaknesses • Sources of assurance available to the Board

Table 5: Example of the 20 questions in the enterprise risk management maturity survey

No.	Question	5	4	3	2	1
1	Does the board have defined responsibilities in the Risk Management process	Yes, Individual responsibilities identified	Yes, Generic responsibilities for Board Members	Undefined, but Board know their responsibilities	Non-board members present risk information only	Risk is not discussed at Board level
2	Is there a committee overseeing Risk Management	Yes, Risk Management committee	Yes, Audit & Risk Committee	Yes, Audit Committee	Yes, committee other than Risk or Audit	No, there is no committee responsible for Risk

The results of the responses from the Risk Managers will be scored according to the above example and a value be recorded from 1 to 5, 5 = high maturity and 1 = low maturity.

The full table can be viewed in Annexure 1: Survey questionnaire for Enterprise Risk Management Maturity

4.7.2 Shareholder Value

Calculations were performed to measure variation of a variable which shows the actual change in a given year, as well as a relative variation of a variable which shows the change in the year previous 5 years.

4.7.2.1 Data Calculations:

Table 6: Calculations Performed on Respondent Share Data

Code	Description	Calculation
SP VAR (Year)	Share price variation from previous year (PY) to current year (CY)	$(SP_{CY} – SP_{PY}) / SP_{PY}$
P/E VAR (Year)	P/E ratio variation from previous year (PY) to current year (CY)	$(PE_{CY} – PE_{PY}) / PE_{PY}$
DY VAR (Year)	Dividend yield variation from previous year (PY) to current year (CY)	$(DY_{CY} – DY_{PY}) / DY_{PY}$
SR VAR (Year)	Shareholder return variation from previous year (PY) to current year (CY)	$((SP_{CY}+DY_{CY}) – (SP_{PY}+DY_{PY})) / (SP_{PY}+DY_{PY})$
VOL VAR (Year)	Volatility of share price from previous year (PY) to current year (CY)	$(VOL_{CY} –VOL_{PY}) / VOL_{PY}$
E VAR (Year)	Earnings variation from previous year (PY) to current year (CY)	$(E_{CY} – E_{PY}) / E_{PY}$

Key:

PY	Previous Year (ending 31 December)
CY	Current Year (ending 31 December)

4.7.2.2 Share price (SP) value increase/decrease - SP VAR

This variable shows the share price between 2008 and 2010 in relation to the previous five year's share price.

4.7.2.3 Price/Earnings (PE) Ratio increase or decrease - P/E VAR

This variable shows the price/earnings ratio between 2008 and 2010 in relation to the previous five year's price/earnings ratio.

4.7.2.4 Dividend Yield (DY) increase or decrease - DY VAR

This variable shows the dividend yield between 2008 and 2010 in relation to the previous five year's dividend yield.

4.7.2.5 Volatility (VOL) increase or decrease - VOL VAR

This variable shows the volatility of share price between 2008 and 2010 in relation to the previous five year's volatility of share price.

4.7.2.6 Shareholder Return (SR) increase or decrease - SRVAR

Shareholder return is calculated as the share price increase or decrease plus the dividend yield. This variable shows the shareholder return between 2008 and 2010 in relation to the previous five year's shareholder return.

4.7.2.7 Earnings (E) increase or decrease - E VAR

This variable shows the earnings between 2008 and 2010 in relation to the previous five year's dividend yield.

4.8 Research Limitations

The limitations of the research are the following:

I. The test for Enterprise Risk Management maturity will be done in 2011 while the statistical data analysis for shareholder value will be done from 2001 onwards.

II. Enterprise Risk Management maturity can be measured through data that can only be collected if the sample organisation responds to the survey.

III. The sample will not be large enough to analyse the effect of Enterprise Risk Management across many industries

IV. Because of many causal contributors to financial performance, this research is not causal in nature and this therefore analysing for correlation only and a positive or negative result is not sufficient to assume a causal relationship.

V. Enterprise Risk Management maturity is qualitative in nature as opposed to the data being recorded which is statistical in nature.

While Enterprise Risk Management is being measured in the present, the nature of ERM implementation and evolution is a lengthy one and it will still be relevant to compare 2011 survey data to 2008 financial data since many of the ERM attributes would already have been put in place.

5. Results

5.1 Sample

5.1.1 Description of Sample

The questionnaire was sent out to 50 companies who are listed on the Johannesburg Stock Exchange (JSE); the correct individual with responsibility for Enterprise Risk Management was identified.

In total 20 responses were received. One of the responses had to be eliminated because their financial data was such a significant outlier (by over 1000%) that the results could possibly be affected by the inclusion of this respondent. The reasons for the outlying financial data are known to the researcher and are not related in any way to Risk Management and therefore not relevant for inclusion in this research.

5.1.1.1 Industry categories

The following industries were included in the research by nature of the responding companies:

- Insurance
- Healthcare
- Leisure
- Construction
- Mining & Resources
- Hospital
- Diversified Holdings
- Retail
- Manufacturing
- Banking

5.1.2 Detail of Sample

The descriptive statistics discussed below were used in the analysis.

- **The Mean** is calculated by summing the values of a variable for all observations and then dividing by the number of observations (Norusis, 2005, p. 94). This describes the central tendency of the data.
- **The Variance** is calculated by finding the squared difference between an observation and the mean, summing for all cases and then dividing by the number of observations minus 1 (Norusis, 2005, p. 94). It shows the relation that a set of scores has to the mean of the sample. This describes the dispersion of the data.
- **The Standard Deviation** is calculated as the square root of the variance (Norusis, 2005, p. 94). This describes the dispersion of the data. Since Standard Deviation is a direct form of Variance, it will be used in place of the latter when reporting.
- **The Median** is considered another measure of central tendency. It is the middle value when observations are ordered from the smallest to the largest (Norusis, 2005, p. 94).
- **Skewness** is a measure of symmetry of a distribution; in most instances the comparison is made to a normal distribution (Hair et al., 2006). Schepers (undated) emphasises those variables with skewness higher than 2 should be avoided.
- **Kurtosis** is a measure of the peakedness or flatness of a distribution when compared with the normal distribution (Hair, Black, Babin, Anderson, & Thatham, 2006, p. 35). Leptokurtosis is normally associated with low reliabilities and should be avoided at all costs. Indices as high as

7 are rather extreme and signify very low reliabilities (Schepers, undated).

5.1.2.1 ERM Maturity Questions - Description

The below Table 7 shows the responses to each question by rating:

(1 = Low ERM Maturity, 5 = High ERM Maturity).

It shows the question number, category/principle that the question originates from, and it shows how many (in real and percentage terms) respondents scored their organisation with that rating.

Table 7: Survey Response Description

Question Number & ERM Maturity Category		1		2		3		4		5	
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
1	RiskArchitecture1	0	.0%	0	.0%	1	5.3%	13	68.4%	5	26.3%
2	RiskArchitecture2	0	.0%	0	.0%	2	10.5%	6	31.6%	11	57.9%
3	RiskArchitecture3	2	10.5%	7	36.8%	1	5.3%	0	.0%	9	47.4%
4	RiskArchitecture4	4	21.1%	4	21.1%	2	10.5%	3	15.8%	6	31.6%
5	RiskArchitecture5	0	.0%	0	.0%	0	.0%	10	52.6%	9	47.4%
6	RiskStrategy1	0	.0%	0	.0%	5	26.3%	5	26.3%	9	47.4%
7	RiskStrategy2	7	36.8%	2	10.5%	5	26.3%	1	5.3%	4	21.1%
8	RiskStrategy3	1	5.3%	1	5.3%	2	10.5%	6	31.6%	9	47.4%
9	RiskStrategy4	1	5.3%	0	.0%	1	5.3%	3	15.8%	14	73.7%
10	RiskStrategy5	2	10.5%	2	10.5%	4	21.1%	4	21.1%	7	36.8%
11	RiskStrategy6	0	.0%	5	26.3%	1	5.3%	5	26.3%	8	42.1%
12	RiskProtocols1	0	.0%	0	.0%	2	10.5%	8	42.1%	9	47.4%
13	RiskProtocols2	0	.0%	2	10.5%	4	21.1%	4	21.1%	9	47.4%
14	RiskProtocols3	2	10.5%	5	26.3%	0	.0%	7	36.8%	5	26.3%
15	RiskProtocols4	1	5.3%	1	5.3%	7	36.8%	5	26.3%	5	26.3%
16	RiskProtocols5	1	5.3%	1	5.3%	0	.0%	6	31.6%	11	57.9%
17	RiskProtocols6	0	.0%	5	26.3%	2	10.5%	10	52.6%	2	10.5%
18	RiskProtocols7	1	5.3%	2	10.5%	4	21.1%	3	15.8%	9	47.4%
19	RiskProtocols8	1	5.3%	2	10.5%	1	5.3%	9	47.4%	6	31.6%
20	RiskProtocols9	2	10.5%	1	5.3%	5	26.3%	3	15.8%	8	42.1%

Table 8 below shows the descriptive statistics described in 5.1.2 for the responses collated.

For the below table, the following abbreviations are relevant:

RA = Risk Architecture
RS = Risk Strategy
RP = Risk Protocols

Table 8: Surveys Response Descriptive Statistics

Question & Category		N Valid	Mean	Median	Std. Deviation	Variance	Skewness	Kurtosis
1	RA1	19	4.21	4.00	.535	.287	.229	.316
2	RA2	19	4.47	5.00	.697	.485	-.998	-.088
3	RA3	19	3.37	3.00	1.640	2.690	-.077	-1.951
4	RA4	19	3.16	3.00	1.608	2.585	-.106	-1.662
5	RA5	19	4.47	4.00	.513	.263	.115	-2.235
6	RS1	19	4.21	4.00	.855	.731	-.446	-1.505
7	RS2	19	2.63	3.00	1.571	2.468	.401	-1.287
8	RS3	19	4.11	4.00	1.150	1.322	-1.452	1.820
9	RS4	19	4.53	5.00	1.020	1.041	-2.710	7.958
10	RS5	19	3.63	4.00	1.383	1.912	-.658	-.701
11	RS6	19	3.84	4.00	1.259	1.585	-.604	-1.334
12	RP1	19	4.37	4.00	.684	.468	-.632	-.527
13	RP2	19	4.05	4.00	1.079	1.164	-.708	-.842
14	RP3	19	3.42	4.00	1.427	2.035	-.464	-1.307
15	RP4	19	3.63	4.00	1.116	1.246	-.503	.117
16	RP5	19	4.32	5.00	1.108	1.228	-2.078	4.254
17	RP6	19	3.47	4.00	1.020	1.041	-.447	-1.045
18	RP7	19	3.89	4.00	1.286	1.655	-.833	-.400
19	RP8	19	3.89	4.00	1.150	1.322	-1.245	1.118
20	RP9	19	3.74	4.00	1.368	1.871	-.778	-.401

5.1.2.2 Share Price Data

Table 9 below shows the descriptive statistics described in 5.1.2 for the responses collated.

For the below table, the following abbreviations are relevant:

SPV(Year) = Share Price Variation (Year)
PEV(Year) = Price/Earnings Variation (Year)
DYV(Year) = Dividend Yield Variation (Year)
VOLV(Year) = Volatility (Share Price) Variation (Year)
SRV(Year) = Shareholder Return Variation (Year)

Table 9: Respondents Share Data Descriptive Statistics

Category	N Valid	Mean	Median	Std. Deviation	Variance	Skewness	Kurtosis
SPV11	19	.088971	.104302	.1002934	.010	.260	1.435
SPV10	19	.272069	.293106	.1558658	.024	.811	1.413
SPV09	19	-.011014	.029790	.2794424	.078	-.193	-.663
SPV08	19	-.167876	-.215848	.2497436	.062	1.936	6.025
SPV07	19	.351102	.332280	.3016729	.091	1.332	2.596
SPV06	19	.516694	.414070	.3394867	.115	1.080	1.460
SPV05	19	.359191	.334457	.2221074	.049	-.370	-.678
SPV04	19	.271499	.360694	.2827858	.080	-.447	-.752
SPV03	19	.107143	.055484	.4530679	.205	2.527	8.056
SPV02	19	.176292	.057167	.3978117	.158	2.672	8.767
PEV11	19	-.044551	-.175896	.7187701	.517	3.773	15.567
PEV10	19	-.019079	.184106	.8709932	.759	-3.501	13.741
PEV09	19	.267341	.236408	1.594946	2.544	-2.449	9.380
PEV08	19	-.125577	-.258605	.7502229	.563	2.766	9.842
PEV07	19	-.186692	-.277962	.2891935	.084	1.399	2.416
PEV06	19	.223572	.164733	.5393933	.291	.948	2.135
PEV05	19	.233302	.066563	1.057076	1.117	2.936	10.848
PEV04	19	-.379199	.146027	2.986339	8.918	-3.861	16.100
PEV03	19	.263002	.262843	.8829474	.780	-1.040	6.305

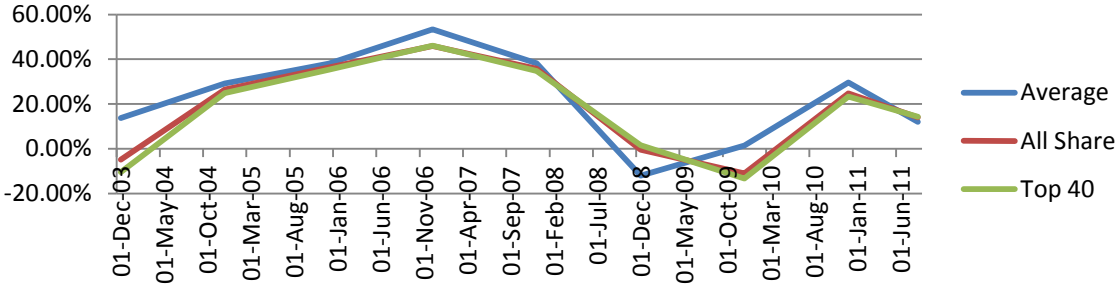
PEV02	19	.140512	-.201794	1.236642	1.529	3.991	16.666
DYV11	19	.435764	.221963	.5521617	.305	2.494	7.019
DYV10	19	-.060961	-.059406	.1256275	.016	.122	.114
DYV09	19	-.427756	-.308426	.3253329	.106	-.818	-.506
DYV08	19	.718004	.511696	.7653961	.586	1.368	1.379
DYV07	19	1.107036	.358650	2.552661	6.516	3.351	11.718
DYV06	18	-.136826	-.037818	.4694103	.220	-.104	.220
DYV05	18	-.031480	.000000	.2798694	.078	.946	3.380
DYV04	18	-.208933	-.045328	.3441750	.118	-1.206	.606
DYV03	18	-.058580	-.028902	.2710300	.073	1.744	5.042
DYV02	18	.153975	.106355	.4565253	.208	-.187	2.542
VOLV11	19	.273240	.239944	.1142304	.013	.874	.152
VOLV10	19	.378703	.332677	.1392749	.019	1.263	1.528
VOLV09	19	.586756	.596401	.1298582	.017	.246	.013
VOLV08	19	.742599	.636884	.2730821	.075	.447	-1.136
VOLV07	19	.442798	.405584	.1361814	.019	.877	.566
VOLV06	19	.517706	.467757	.1892788	.036	2.120	4.590
VOLV05	19	.520220	.486518	.1239030	.015	.852	-.386
VOLV04	19	.554185	.538836	.1595561	.025	.871	.981
VOLV03	19	.554568	.565724	.1514744	.023	-.375	-.458
VOLV02	19	.517941	.409639	.2224098	.049	1.359	1.403
VOLV01	19	.465512	.318471	.3244635	.105	2.229	6.256
SRV11	19	.119471	.127002	.1030486	.011	.198	1.790
SRV10	19	.295758	.310152	.1608437	.026	.726	1.262
SRV09	19	.014144	.066190	.2887211	.083	-.216	-.598
SRV08	19	-.120823	-.184648	.2515684	.063	1.854	5.425
SRV07	19	.381697	.351280	.2948733	.087	1.297	2.587
SRV06	19	.533451	.443570	.3342328	.112	1.109	1.589
SRV05	19	.379875	.358319	.2257430	.051	-.420	-.497
SRV04	19	.292194	.360694	.2853244	.081	-.489	-.702
SRV03	19	.137217	.064284	.4492141	.202	2.618	8.475
SRV02	19	.206624	.057167	.4023443	.162	2.553	8.143

5.2 Data Validity – Relative Representation

It is critically important that population sample represents the population universe, given that only 10% or less of the JSE listed companies are being analysed. For this reason each of the variables in regards to shareholder value has been compared to two of the stock exchange indexes, namely the All Share and the Top 40.

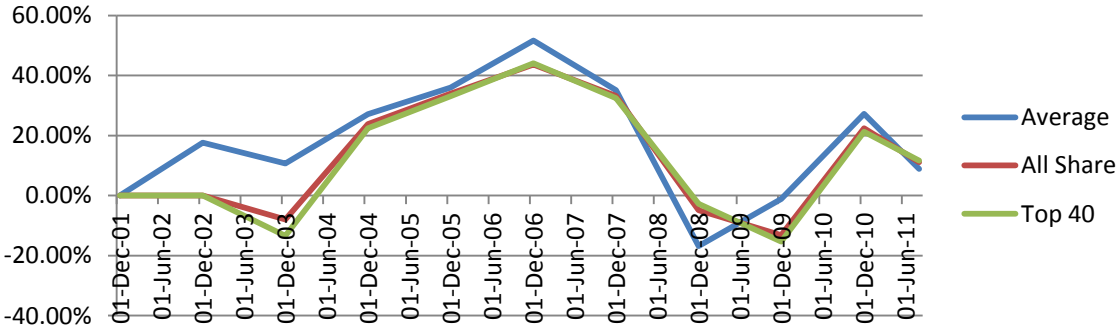
5.2.1 Shareholder Return

Figure 7: Shareholder Return Relative Representation



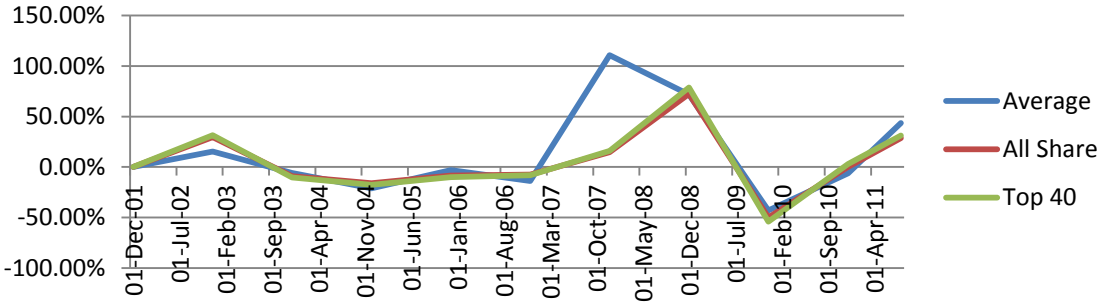
5.2.2 Share Price

Figure 8: Share Price Relative Representation



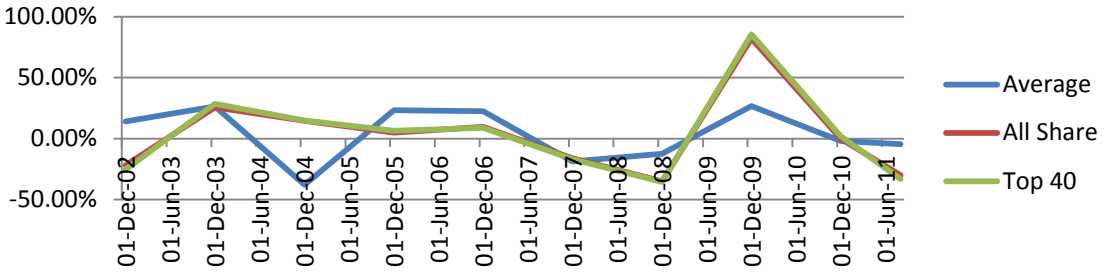
5.2.3 Dividend Yield

Figure 9: Dividend Yield Relative Representation



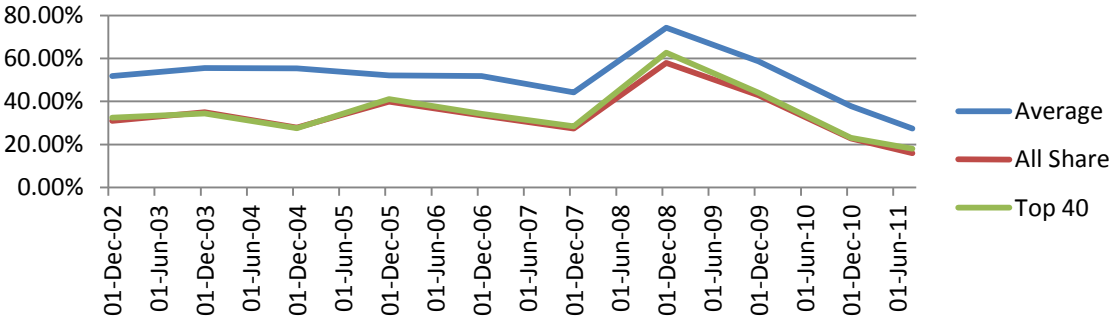
5.2.4 Price/Earnings Ratio

Figure 10: Price/Earnings Ratio Relative Representation



5.2.5 Volatility

Figure 11: Volatility Relative Representation



5.3 Bias Analysis

Table 10 below shows the result of a test for bias – i.e. was the data collected representative of the larger picture (in this case, the All Share and Top 40). Since sample size was a hurdle, non-parametric testing was utilised.

The tests in essence determined if the means of the groups (P/E Change compare to 2001 – 7, Shareholder Return, etc.) were alike across the 3 groups.

Table 10: Bias Analysis Results

Row Labels	N	Chi-Square	df	p-value
DY Variation Year to	10	0.00	2	1.00
P/E Change compare to 2001 - 7	4	0.50	2	0.78
P/E Variation Year to	10	0.20	2	0.90
Share price Variation Year to	9	4.67	2	0.10
Shareholder Return	9	4.67	2	0.10
Shareholder Return Change compare to 2001 - 7	4	0.50	2	0.78
SP Change compare to 2001 - 7	4	0.50	2	0.78
Volatility Change compare to 2001 - 7	4	1.50	2	0.47
Volatility Year to	10	16.80	2	0.00

The test carried out was the Friedman test. Friedman tests whether k related samples have been drawn from the same population - i.e. are the groups the same.

If the p-value is < 0.05 then the groups differ. In this case, only “Volatility Year to” was found not to be comparable across the groups.

5.4 Calculations performed on collected data

5.4.1 Enterprise Risk Management Maturity Calculations

The tables below shows the descriptive statistics of the Enterprise Risk Management maturity data collected averaged into the various categories being Risk Architecture, Risk Strategy, Risk Protocols and Total. The codes in Table 11 will aid in the understanding of Table 12.

Table 11: Structure of Survey and Abbreviations

Code	Description	Calculation
RA Av	Risk Architecture Average	Average of Questions 1- 5
RS Av	Risk Strategy Average	Average of Questions 6- 11
RP Av	Risk Protocols Average	Average of Questions 11- 20
Total Av	Total Average	Average of Questions 1- 20

Table 12: Respondents Share Data Descriptive Statistics

	N Valid	Mean	Median	Std. Deviation	Variance	Skewness	Kurtosis
RA Av	19	3.93	3.80	.6635013	.440	-.108	-.997
RS Av	19	3.82	3.83	.7504601	.563	-.125	-.631
RP Av	19	3.86	3.88	.6047128	.366	-.706	.803
TOTAL AV	19	3.87	3.85	.6147077	.378	-.268	.116

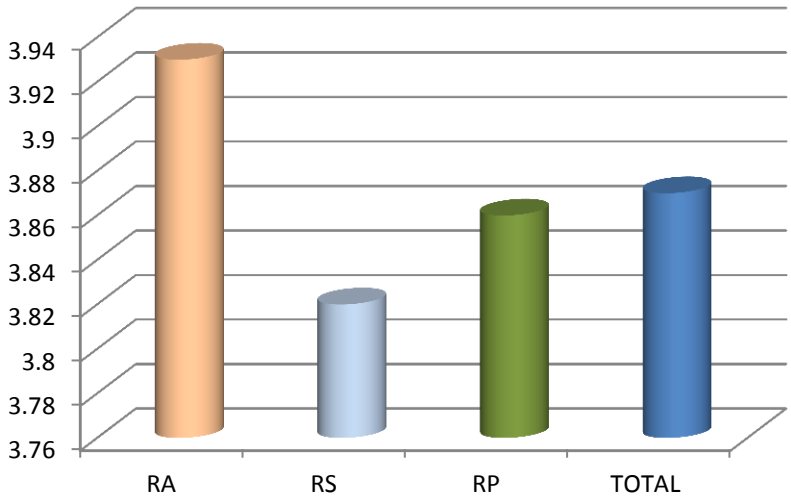


Figure 12: Average Maturity Ratings per Category

5.4.2 Share Data Calculations (Post Simple Moving Average)

The share data was varied using the Simple Moving Average (SMA); a simple moving average is calculated by adding the closing price of the share for a number of time periods and then dividing this total by the number of time periods. Short-term averages respond quickly to changes in the price of the underlying, while long-term averages are slow to react. Moving averages smooth the price data to form a trend following indicator. They do not predict price direction, but rather define the current direction with a lag. Moving averages lag because they are based on past prices. Despite this lag, moving averages help smooth price action and filter out the noise.

The nature of this research is the impact after the economic downturn in 2008, and therefore the data includes 2008 to 2010.

Within Table 13, the following abbreviations have been used:

SPV(Year) = Share Price Variation (Year)
PEV(Year) = Price/Earnings Variation (Year)
DYV(Year) = Dividend Yield Variation (Year)
VOLV(Year) = Volatility (Share Price) Variation (Year)
SRV(Year) = Shareholder Return Variation (Year)

Table 13: Calculations Performed- Descriptive Statistics

	N Valid	Mean	Median	Std. Deviation	Variance	Skewness	Kurtosis
SPV10	19	1.84	1.57	2.43	5.93	3.71	15.21
SPV09	19	0.19	0.11	1.06	1.13	0.37	0.09
SPV08	19	-0.85	-0.73	1.32	1.75	-0.95	2.41
PEV10	19	-13.29	-0.18	34.59	1196.57	-2.62	7.31
PEV09	19	-9.73	-1.86	36.01	1296.52	-4.05	17.24
PEV08	19	4.19	-0.19	17.73	314.36	3.77	15.43
DYV10	19	-0.52	-0.32	1.24	1.54	1.00	3.83
DYV09	19	-1.80	-1.46	2.26	5.13	-0.17	0.05
DYV08	19	6.9E+07	0.05	3E+08	9.15E+16	4.36	19.00
VOLV10	19	0.69	0.63	0.25	0.06	1.47	1.94
VOLV09	19	1.08	0.98	0.23	0.05	0.72	-0.37
VOLV08	19	1.43	1.43	0.46	0.21	0.29	-0.80
SRV10	19	1.59	1.44	1.71	2.92	3.39	13.41
SRV09	19	0.25	0.27	0.97	0.94	0.02	-0.47
SRV08	19	-0.54	-0.54	1.02	1.04	-0.14	2.70
EVAR10	19	0	0.1715	0.2091	0.63279	0.4	0.187
EVAR09	19	0	-0.1639	-0.0208	0.79945	0.639	-1.567
EVAR08	19	0	0.0607	-0.0719	0.78327	0.614	1.836

5.5 Correlations

This correlation analysis will assist in addressing the propositions; this will be performed on the data after the simple moving average (SMA) calculation has been performed. Correlation analysis is the analysis of the degree to which changes in one variable is associated with changes in another (McDaniel & Gates, 2006) It is a measure of the relation between two or more variables. Correlation coefficients can range from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation, while a value of +1.00 represents a perfect positive correlation. A value of 0.00 represents a lack of correlation. The most commonly used measurement is the Pearson product-moment correlation, which is a measure of linear association between two variables. However, due to the sample consisting of 19 cases, the researcher chose Spearman's rank correlation coefficient (or commonly, Spearman's rho) given its prevalence as a non-parametric measure of correlation. The correlation coefficient may be interpreted as detailed in Table 14.

Table 14: Interpretation of the Correlation Coefficient

Correlation Coefficient	Interpretation
-1.0 to -0.8	HIGH
-0.8 to -0.6	SUBSTANTIAL
-0.6 to -0.4	MEDIUM
-0.4 to -0.2	LOW
-0.2 to 0.2	VERY LOW
0.2 to 0.4	LOW
0.4 to 0.6	MEDIUM
0.6 to 0.8	SUBSTANTIAL
0.8 to 1.0	HIGH

Caution is advised when interpreting correlation coefficients; they give no indication of the direction of causality. This is based on two reasons:

- **A possible third variable** – in any bivariate correlation, causality between two variables cannot be assumed because there may be other measured or unmeasured variables affecting the results; and
- **Causality direction** – correlation coefficients indicate nothing about which variable causes the other to change.

In the correlation tables 15 - 19 below, the following legend refers:

Corr	=	Spearman's rho correlation coefficient
p-value	=	The P-value
N	=	Number of cased involved
RA	=	Risk Architecture Maturity
RS	=	Risk Strategy Maturity
RP	=	Risk Protocols Maturity
TOTAL	=	Total ERM Maturity

5.5.1 Share Price Variation

Table 15: Correlation Results for Share Price Variation

		RA	RS	RP	TOTAL
Share Price Variation Year to Dec 2010	Corr	0.372	0.34	0.355	0.388
	p-value	0.116	0.155	0.136	0.1
	N	19	19	19	19
Share Price Variation Year to Dec 2009	Corr	0.093	-0.077	0.113	-0.007
	p-value	0.706	0.753	0.644	0.977
	N	19	19	19	19
Share Price Variation Year to Dec 2008	Corr	-0.532	-0.289	-0.421	-0.393
	p-value	**0.018**	0.229	0.073	0.096
	N	19	19	19	19

5.5.2 Price/Earnings Ratio Variation

Table 16: Correlation Results for Price/Earnings Ratio Variation

		RA	RS	RP	TOTAL
Price/Earnings Variation Year to Dec 2010	Corr	0.104	-0.055	-0.115	-0.033
	p-value	0.671	0.824	0.639	0.892
	N	19	19	19	19
Price/Earnings Variation Year to Dec 2009	Corr	-0.144	-0.249	-0.194	-0.257
	p-value	0.557	0.304	0.426	0.289
	N	19	19	19	19
Price/Earnings Variation Year to Dec 2008	Corr	-0.041	0.008	-0.061	-0.1
	p-value	0.869	0.974	0.804	0.683
	N	19	19	19	19

5.5.3 Dividend Yield Variation

Table 17: Correlation Results for Dividend Yield Variation

		RA	RS	RP	TOTAL
Dividend Yield Variation Year to Dec 2010	Corr	-0.089	-0.098	-0.041	-0.028
	p-value	0.716	0.69	0.868	0.909
	N	19	19	19	19
Dividend Yield Variation Year to Dec 2009	Corr	0.186	-0.044	-0.095	-0.042
	p-value	0.445	0.858	0.7	0.864
	N	19	19	19	19
Dividend Yield Variation Year to Dec 2008	Corr	-0.109	-0.172	0.122	-0.064
	p-value	0.658	0.48	0.618	0.794
	N	19	19	19	19

5.5.4 Volatility (Share Price) Variation

Table 18: Correlation Results for Volatility Variation

		RA	RS	RP	TOTAL
Volatility Variation Year to Dec 2010	Corr	0.011	-0.052	0.143	-0.013
	p-value	0.966	0.833	0.56	0.957
	N	19	19	19	19
Volatility Variation Year to Dec 2009	Corr	0.29	0.41	0.332	0.405
	p-value	0.228	0.081	0.165	0.085
	N	19	19	19	19
Volatility Variation Year to Dec 2008	Corr	0.163	0.019	0.01	0.078
	p-value	0.504	0.937	0.968	0.75
	N	19	19	19	19

5.5.5 Shareholder Return Variation

Table 19: Correlation Results for Shareholder Return Variation

		RA	RS	RP	TOTAL
Shareholder Return Variation Year to Dec 2010	Corr	0.377	0.32	0.359	0.375
	p-value	0.112	0.181	0.132	0.113
	N	19	19	19	19
Shareholder Return Variation Year to Dec 2009	Corr	0.14	-0.048	0.133	0.018
	p-value	0.567	0.844	0.588	0.94
	N	19	19	19	19
Shareholder Return Variation Year to Dec 2008	Corr	-0.538	-0.303	-0.449	-0.398
	p-value	**0.018**	0.208	0.054	0.091
	N	19	19	19	19

5.5.6 Earnings Variation

Table 20: Correlation Results for Earnings Variation

		RA	RS	RP	TOTAL
Earnings Variation Year to Dec 2010	Corr	-0.359	-0.244	0.017	-0.174
	p-value	0.143	0.329	0.948	0.491
	N	18	18	18	18
Earnings Variation Year to Dec 2009	Corr	0.202	0.039	-0.066	0.491
	p-value	0.423	0.877	0.796	1
	N	18	18	18	18
Earnings Variation Year to Dec 2008	Corr	-0.317	-0.209	-0.218	-0.237
	p-value	0.2	0.405	0.384	0.344
	N	18	18	18	18

6. Discussion of Results

The discussion of results shall be structured so as to analyse each of the six propositions individually, and then discuss the holistic results subsequently.

Organisations that implement an ERM program do so with a significant investment; both the output of the ERM program and the input costs are visible to shareholders and they will demand that value be derived from this outlay.

6.1 Discussion of Results for Proposition 1

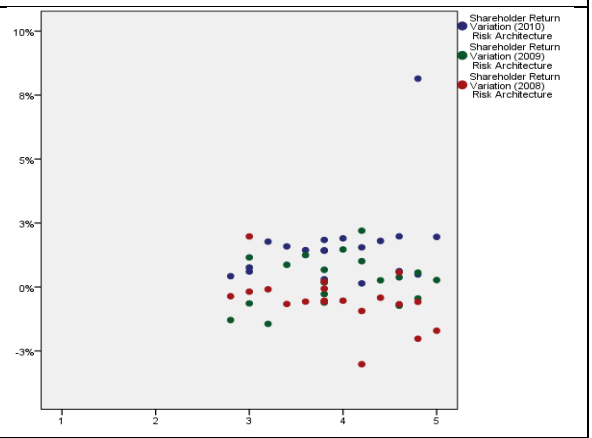
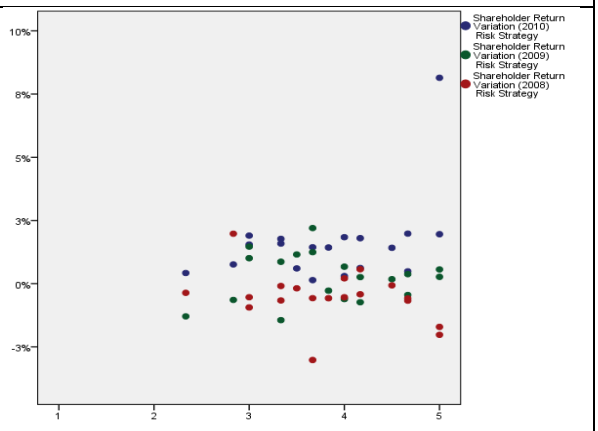
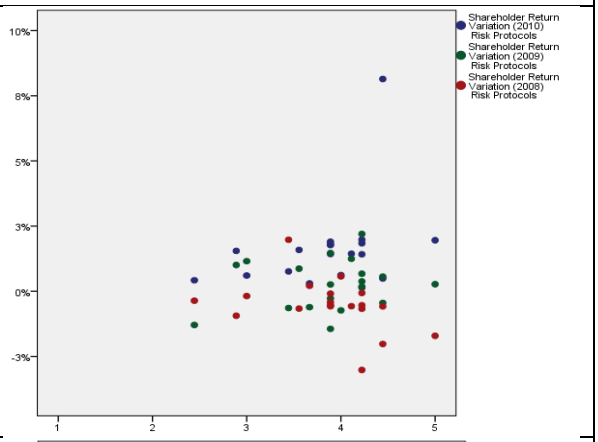
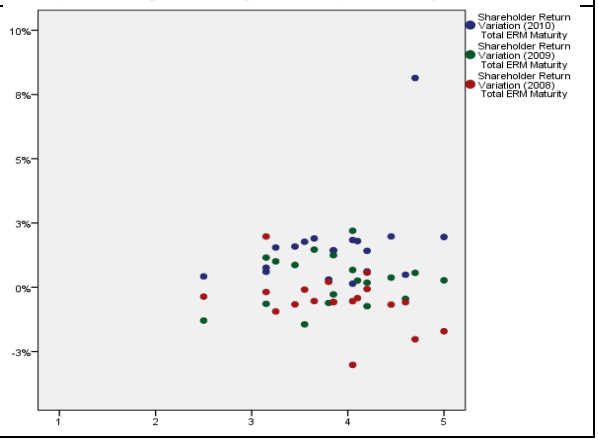
There is a positive correlation between organisations with mature ERM programs and shareholder value in an economic downturn.

The first proposition is both the most general and the most important of the six propositions. This is because shareholder value is considered to be one of the most significant driving forces of each organisation; decisions are made with the long term goal of returning value to the shareholder.

Shareholder value, which is measured using a combination of share price variation and dividend yield, is the most obvious form of benefit that shareholders will demand from the board as a result of investment in an Enterprise Risk Management program.

Table 21 below shows the correlation of Shareholder Return Variation and each of the Enterprise Risk Management Maturity principles (Risk Architecture, Risk Strategy, Risk Protocol and Total ERM Maturity).

Table 21: Proposition 1 (Shareholder Return) Correlation Analysis

CORRELATION	YEAR	CORR	P-VALUE	PLOT
Figure 13: Correlation of Shareholder Value and Risk Architecture Maturity	**2010**	0.377	0.112	
	2009	0.14	0.567	
	2008	0.538	**0.018**	
Figure 14: Correlation of Shareholder Value and Risk Strategy Maturity	**2010**	0.32	0.181	
	2009	-0.048	0.844	
	2008	-0.303	0.208	
Figure 15: Correlation of Shareholder Value and Risk Protocol Maturity	**2010**	0.359	0.132	
	2009	0.133	0.588	
	2008	-0.449	0.054	
Figure 16: Correlation of Shareholder Value and Total ERM maturity	**2010**	0.375	0.113	
	2009	0.018	0.94	
	2008	-0.398	0.091	

6.1.1 Shareholder Return and Risk Architecture Maturity

2008 - There is a statistically significant correlation between Risk Architecture maturity and Shareholder Return in 2008. There is a high probability that Risk Architecture maturity explains 54% of the Shareholder Value in a year (2008) that an economic downturn occurs.

2009 - There is no statistically significant correlation between Risk Architecture maturity and Shareholder Return in 2009.

2010 - There is no statistically significant correlation between Risk Architecture maturity and Shareholder Return in 2010.

6.1.2 Shareholder Return and Risk Strategy Maturity

2008 - There is no statistically significant correlation between Risk Strategy maturity and Shareholder Return in 2008.

2009 - There is no statistically significant correlation between Risk Strategy maturity and Shareholder Return in 2009.

2010 - There is no statistically significant correlation between Risk Strategy maturity and Shareholder Return in 2010.

6.1.3 Shareholder Return and Risk Protocol Maturity

2008 - There is no statistically significant correlation between Risk Protocol maturity and Shareholder Return in 2008.

2009 - There is no statistically significant correlation between Risk Protocol maturity and Shareholder Return in 2009.

2010 - There is no statistically significant correlation between Risk Protocol maturity and Shareholder Return in 2010.

6.1.4 Shareholder Return and Total ERM Maturity

2008 - There is no statistically significant correlation between Total ERM maturity and Shareholder Return in 2008.

2009 - There is no statistically significant correlation between Total ERM maturity and Shareholder Return in 2009.

2010 - There is no statistically significant correlation between Total ERM maturity and Shareholder Return in 2010.

6.1.5 Findings for Proposition 1

The medium correlation co-efficient, between Shareholder Value and Risk Architecture for 2008 shows that a mature Risk Architecture may assist in the insulation of the shareholder from the worst of an economic downturn.

Risk Architecture relates the structure of the ERM program in an organisation such as:

- Board Responsibilities being defined
- Dedicated Risk committee
- Measurement of Risk Maturity
- Multiple Assurance Providers

All of these items relate to roles and responsibilities for risk management in the organisation, i.e. the fundamental accountability for the risks the organisation faces.

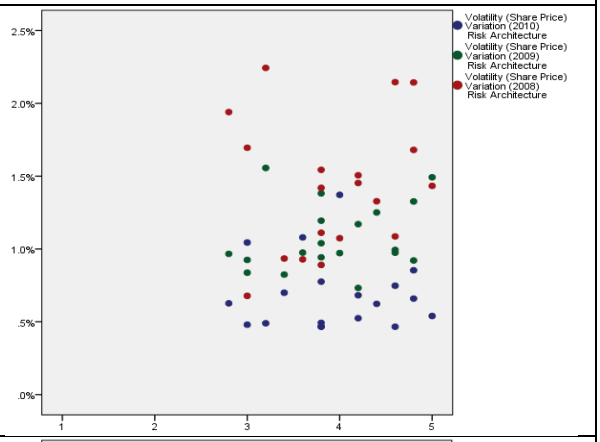
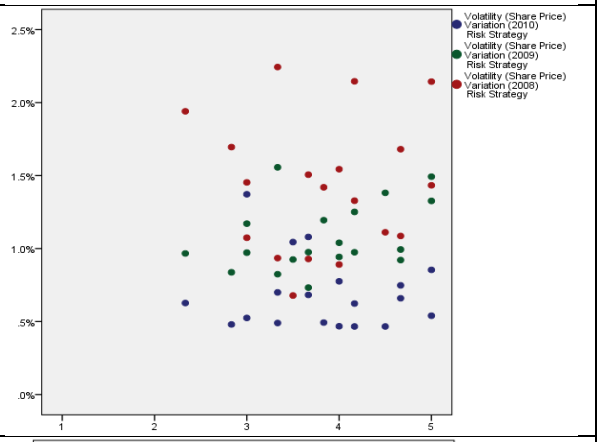
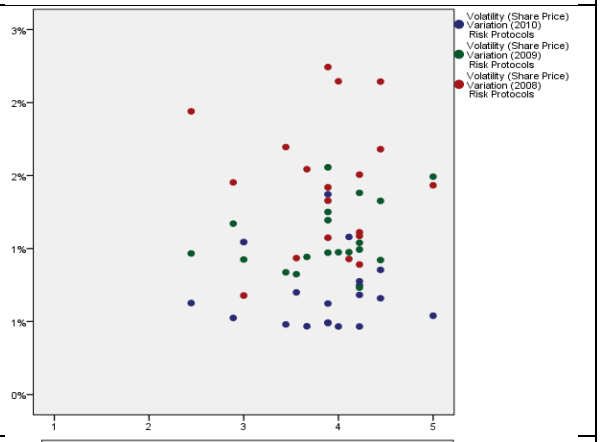
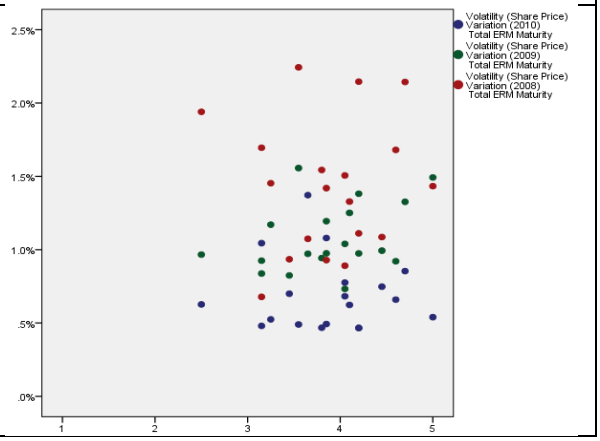
6.2 Discussion of Results for Proposition 2

There is a positive correlation between organisations with mature ERM programs and Share Price Volatility in an economic downturn.

Risk Management, by its very nature, is focussed on managing the effect of uncertainty; it is normally uncertainty that creates volatility in share prices; this is true for individual companies and the stock market index holistically. It is therefore expected that organisations with high ERM maturity will have less volatile share prices.

Table 22 below shows the correlation of Shareholder Price Volatility and each of the Enterprise Risk Management Maturity principles (Risk Architecture, Risk Strategy, Risk Protocol and Total ERM Maturity).

Table 22: Proposition 2 (Share Price Volatility) Correlation Analysis

CORRELATION	YEAR	CORR	P-VALUE	PLOT
Figure 17: Correlation of Share Price Volatility and Risk Architecture Maturity	**2010**	0.011	0.966	
	2009	0.29	0.228	
	2008	0.163	0.504	
Figure 18: Correlation of Share Price Volatility and Risk Strategy Maturity	**2010**	-0.052	0.833	
	2009	0.41	0.081	
	2008	0.019	0.937	
Figure 19: Correlation of Share Price Volatility and Risk Protocol Maturity	**2010**	0.143	0.56	
	2009	0.332	0.165	
	2008	0.01	0.968	
Figure 20: Correlation of Share Price Volatility and Total ERM maturity	**2010**	-0.013	0.957	
	2009	0.405	0.085	
	2008	0.078	0.75	

6.2.1 Share Price Volatility and Risk Architecture Maturity

2008 - There is no statistically significant correlation between Risk Architecture maturity and Share Price Volatility in 2008.

2009 - There is no statistically significant correlation between Risk Architecture maturity and Share Price Volatility in 2009.

2010 - There is no statistically significant correlation between Risk Architecture maturity and Share Price Volatility in 2010.

6.2.2 Share Price Volatility and Risk Strategy Maturity

2008 - There is no statistically significant correlation between Risk Strategy maturity and Share Price Volatility in 2008.

2009 - There is no statistically significant correlation between Risk Strategy maturity and Share Price Volatility in 2009.

2010 - There is no statistically significant correlation between Risk Strategy maturity and Share Price Volatility in 2010.

6.2.3 Share Price Volatility and Risk Protocol Maturity

2008 - There is no statistically significant correlation between Risk Protocol maturity and Share Price Volatility in 2008.

2009 - There is no statistically significant correlation between Risk Protocol maturity and Share Price Volatility in 2009.

2010 - There is no statistically significant correlation between Risk Protocol maturity and Share Price Volatility in 2010.

6.2.4 Share Price Volatility and Total ERM Maturity

2008 - There is no statistically significant correlation between Total ERM maturity and Share Price Volatility in 2008.

2009 - There is no statistically significant correlation between Total ERM maturity and Share Price Volatility in 2009.

2010 - There is no statistically significant correlation between Total ERM maturity and Share Price Volatility in 2010.

6.2.5 Findings for Proposition 2

The lack of any correlations in volatility came as a surprise to the researcher; the fundamental premise of ERM is the removal of uncertainty (positive and negative), which should reduce the volatility of the share price if the market takes the risk maturity into account.

These results suggest that the volatility of an organisations share price are not affected by its internal management of uncertainty and that external factors have a greater influence that risk maturity.

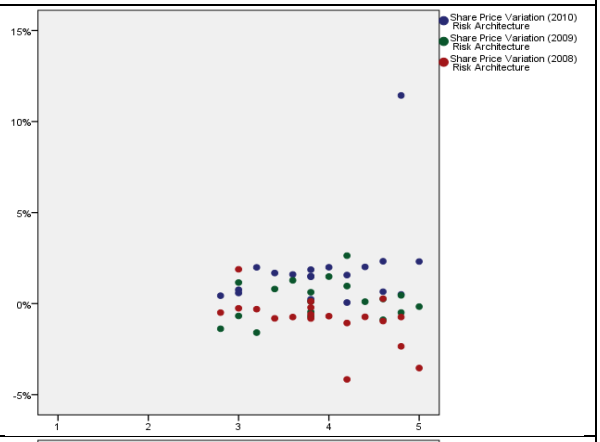
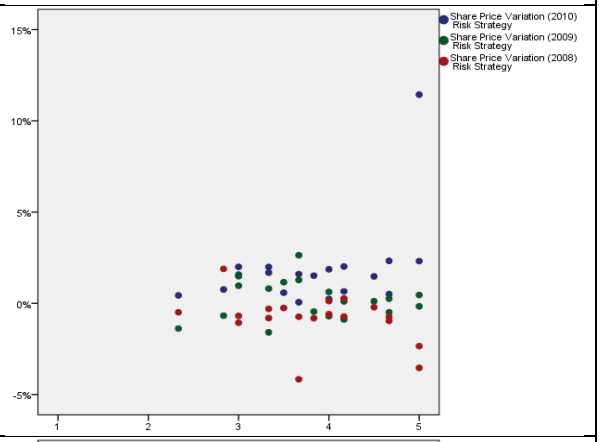
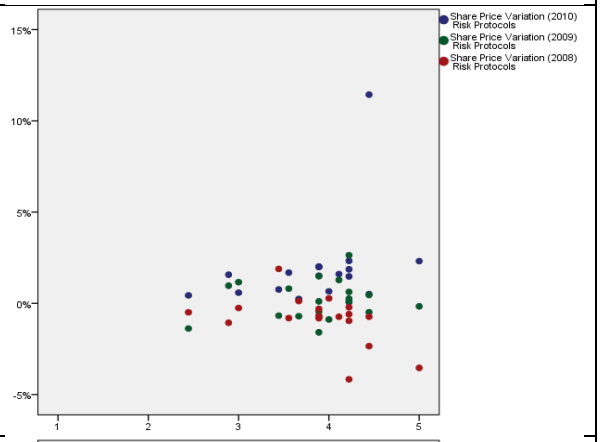
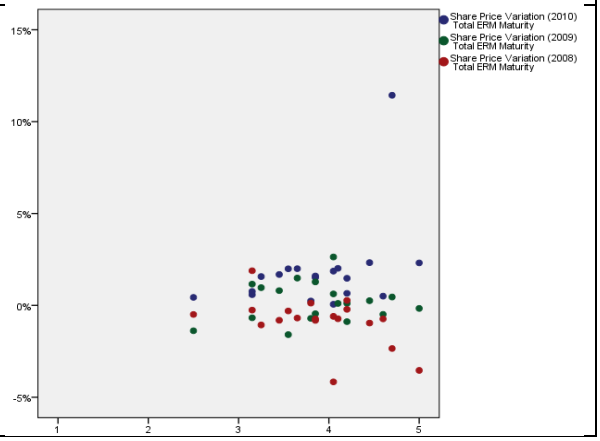
6.3 Discussion of Results for Proposition 3

There is a positive correlation between organisations with mature ERM programs and share price in an economic downturn.

Share Price reflects the market expectation of future earnings of an organisation and it would be expected that an organisation with a high level of ERM maturity would be seen more favourably in terms of their future earnings and hence their share price would perform better than organisations with less mature ERM programs.

Table 23 below shows the correlation of Share Price Variation and each of the Enterprise Risk Management Maturity principles (Risk Architecture, Risk Strategy, Risk Protocol and Total ERM Maturity).

Table 23: Proposition 3 (Share Price) Correlation Analysis

CORRELATION	YEAR	CORR	P-VALUE	PLOT
Figure 21: Correlation of Share Price and Risk Architecture Maturity	**2010**	0.372	0.116	
	2009	0.093	0.706	
	2008	0.532	**0.019**	
Figure 22: Correlation of Share Price and Risk Strategy Maturity	**2010**	0.34	0.155	
	2009	-0.077	0.753	
	2008	-0.289	0.229	
Figure 23: Correlation of Share Price and Risk Protocol Maturity	**2010**	0.355	0.136	
	2009	0.113	0.644	
	2008	-0.421	0.073	
Figure 24: Correlation of Share Price and Total ERM maturity	**2010**	0.388	0.1	
	2009	-0.007	0.977	
	2008	-0.393	0.096	

6.3.1 Share Price and Risk Architecture Maturity

2008 - There is a statistically significant correlation between Risk Architecture maturity and Share Price in 2008. There is a high probability that Risk Architecture maturity explains 53% of the Share price variation in a year (2008) that an economic downturn occurs.

2009 - There is no statistically significant correlation between Risk Architecture maturity and Share Price in 2009.

2010 - There is no statistically significant correlation between Risk Architecture maturity and Share Price in 2010.

6.3.2 Share Price and Risk Strategy Maturity

2008 - There is no statistically significant correlation between Risk Strategy maturity and Share Price in 2008.

2009 - There is no statistically significant correlation between Risk Strategy maturity and Share Price in 2009.

2010 - There is no statistically significant correlation between Risk Strategy maturity and Share Price in 2010.

6.3.3 Share Price and Risk Protocol Maturity

2008 - There is no statistically significant correlation between Risk Protocol maturity and Share Price in 2008.

2009 - There is no statistically significant correlation between Risk Protocol maturity and Share Price in 2009.

2010 - There is no statistically significant correlation between Risk Protocol maturity and Share Price in 2010.

6.3.4 Share Price and Total ERM Maturity

2008 - There is no statistically significant correlation between Total ERM maturity and Share Price in 2008.

2009 - There is no statistically significant correlation between Total ERM maturity and Share Price in 2009.

2010 - There is no statistically significant correlation between Total ERM maturity and Share Price in 2010.

6.3.5 Findings for Proposition 3

The medium correlation co-efficient, between Share Price and Risk Architecture for 2008 shows that a mature Risk Architecture may persuade analysts and investors that the future earnings of the organisation are more certain because of the strong Risk Architecture.

Risk Architecture relates the structure of the ERM program in an organisation such as:

- Board Responsibilities
- Dedicated Risk committee
- Measurement of Risk Maturity
- Multiple Assurance Providers

All of these items relate to roles and responsibilities for risk management in the organisation, i.e. the fundamental accountability for the risks the organisation faces.

6.4 Discussion of Results for Proposition 4

There is a correlation between organisations with mature ERM programs and dividend yield in an economic downturn.

Dividend pay-outs are a reflection of the amount of profit/cash that management chose to return to shareholders.

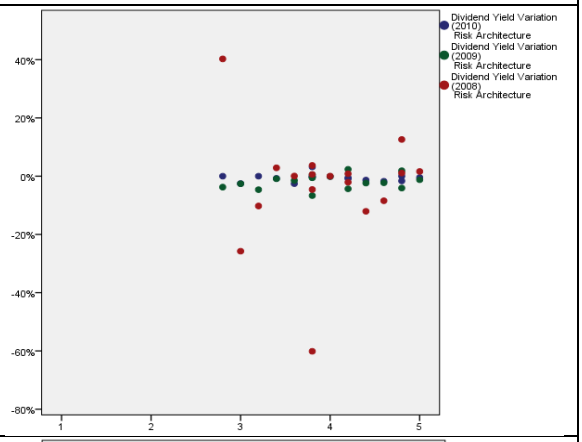
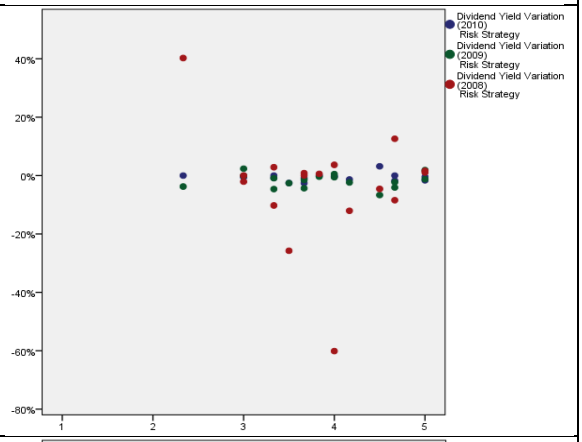
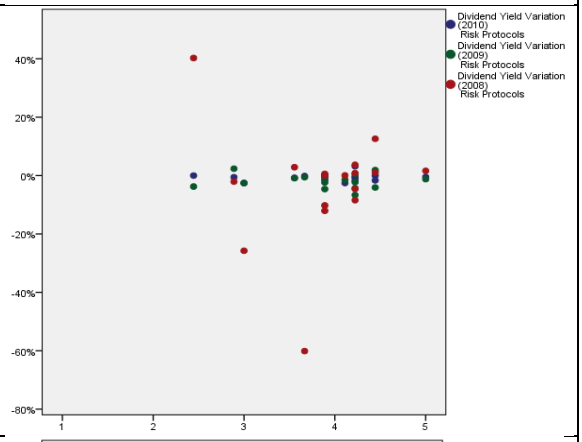
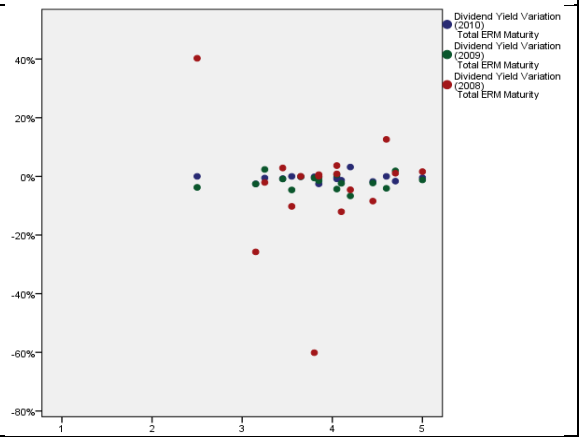
Dividends are not necessarily an indication of performance, as a dividend can be declared in order to maintain investor confidence independent of the financial results.

It would be expected that organisations with mature ERM processes will perform better in economic downturns and therefore maintain their dividend pay-out, as compared with those organisations with less mature ERM processes.

On the other hand, there were some high profile cases where companies took the step of withholding a dividend, and it could be argued that organisations with high risk maturity or a high risk aversion would be more inclined to retain their cash.

Table 24 below shows the correlation of Dividend Yield Variation and each of the Enterprise Risk Management Maturity principles (Risk Architecture, Risk Strategy, Risk Protocol and Total ERM Maturity).

Table 24: Proposition 4 (Dividend Yield) Correlation Analysis

CORRELATION	YEAR	CORR	P-VALUE	PLOT
Figure 25: Correlation of Dividend Yield and Risk Architecture Maturity	2010	-0.089	0.716	
	2009	0.186	0.445	
	2008	-0.109	0.658	
Figure 26: Correlation of Dividend Yield and Risk Strategy Maturity	2010	-0.098	0.69	
	2009	-0.044	0.858	
	2008	-0.172	0.48	
Figure 27: Correlation of Dividend Yield and Risk Protocol Maturity	2010	-0.041	0.868	
	2009	-0.095	0.7	
	2008	0.122	0.618	
Figure 28: Correlation of Dividend Yield and Total ERM maturity	2010	-0.028	0.909	
	2009	-0.042	0.864	
	2008	-0.064	0.794	

6.4.1 Dividend Yield and Risk Architecture Maturity

2008 - There is no statistically significant correlation between Risk Architecture maturity and Dividend Yield in 2008.

2009 - There is no statistically significant correlation between Risk Architecture maturity and Dividend Yield in 2009.

2010 - There is no statistically significant correlation between Risk Architecture maturity and Dividend Yield in 2010.

6.4.2 Dividend Yield and Risk Strategy Maturity

2008 - There is no statistically significant correlation between Risk Strategy maturity and Dividend Yield in 2008.

2009 - There is no statistically significant correlation between Risk Strategy maturity and Dividend Yield in 2009.

2010 - There is no statistically significant correlation between Risk Strategy maturity and Dividend Yield in 2010.

6.4.3 Dividend Yield and Risk Protocol Maturity

2008 - There is no statistically significant correlation between Risk Protocol maturity and Dividend Yield in 2008.

2009 - There is no statistically significant correlation between Risk Protocol maturity and Dividend Yield in 2009.

2010 - There is no statistically significant correlation between Risk Protocol maturity and Dividend Yield in 2010.

6.4.4 Dividend Yield and Total ERM Maturity

2008 - There is no statistically significant correlation between Total ERM maturity and Dividend Yield in 2008.

2009 - There is no statistically significant correlation between Total ERM maturity and Dividend Yield in 2009.

2010 - There is no statistically significant correlation between Total ERM maturity and Dividend Yield in 2010.

6.4.5 Findings for Proposition 4

The lack of any correlations in Dividend Yield suggests that the dividend declared by an organisation during an economic downturn is not affected by the organisations risk maturity.

Decisions pertaining to dividend are made by management and therefore less exposed to the effects of uncertainty, which risk management purports to reduce the effects of.

6.5 Discussion of Results for Proposition 5

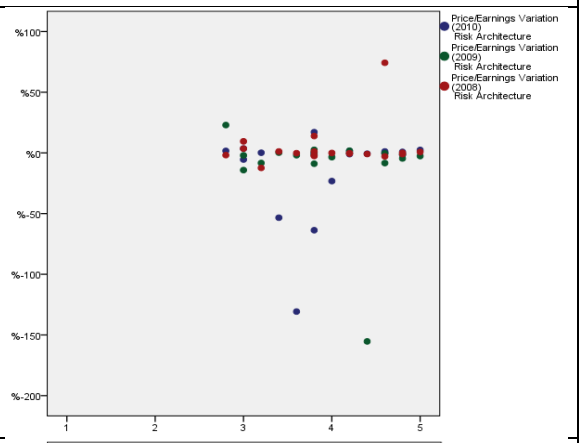
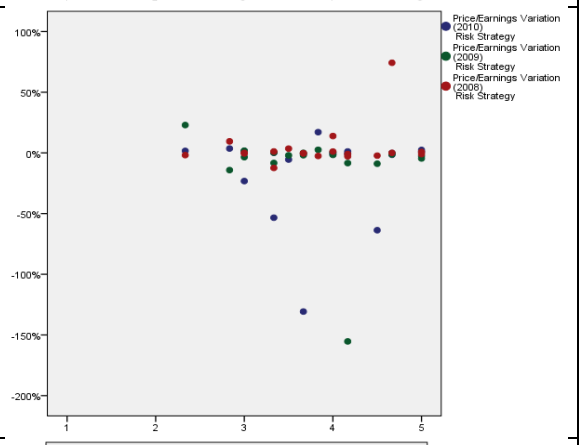
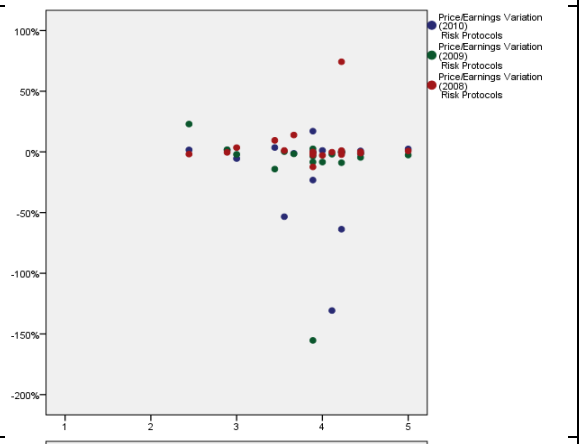
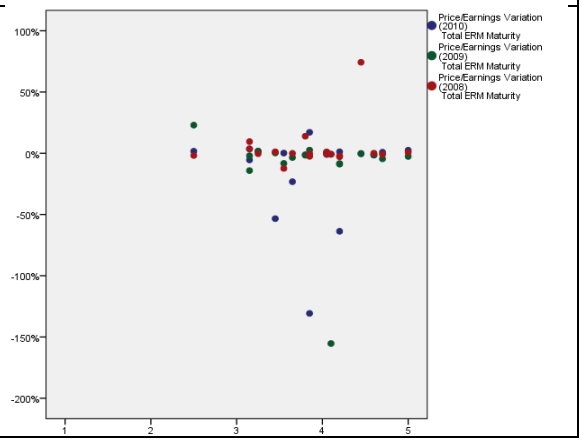
There is a correlation between organisations with mature ERM programs and Price to Earnings Ratios (P/E Ratio) in an economic downturn.

The Price to Earnings Ratio shows the relationship between the market's expectations of its future earnings (reflected in the share price) and organisations current earnings (profit).

If future earnings are more certain because of mature risk management being practised, a correlation would be expected between ERM maturity and the organisations P/E ratio.

Table 25 below shows the correlation of P/E Ratio Variation and each of the Enterprise Risk Management Maturity principles (Risk Architecture, Risk Strategy, Risk Protocol and Total ERM Maturity).

Table 25: Proposition 5 (P/E Ratio) Correlation Analysis

CORRELATION	YEAR	CORR	P-VALUE	PLOT
Figure 29: Correlation of P/E Variation and Risk Architecture Maturity	2010	0.104	0.671	
	2009	-0.144	0.557	
	2008	-0.041	0.869	
Figure 30: Correlation of P/E Variation and Risk Strategy Maturity	2010	-0.055	0.824	
	2009	-0.249	0.304	
	2008	0.008	0.974	
Figure 31: Correlation of P/E Variation and Risk Protocol Maturity	2010	-0.115	0.639	
	2009	-0.194	0.426	
	2008	-0.061	0.804	
Figure 32: Correlation of P/E Variation and Total ERM maturity	2010	-0.033	0.892	
	2009	-0.257	0.289	
	2008	-0.1	0.683	

6.5.1 P/E Ratio and Risk Architecture Maturity

2008 - There is no statistically significant correlation between Risk Architecture maturity and P/E Ratio in 2008.

2009 - There is no statistically significant correlation between Risk Architecture maturity and P/E Ratio in 2009.

2010 - There is no statistically significant correlation between Risk Architecture maturity and P/E Ratio in 2010.

6.5.2 P/E Ratio and Risk Strategy Maturity

2008 - There is no statistically significant correlation between Risk Strategy maturity and P/E Ratio in 2008.

2009 - There is no statistically significant correlation between Risk Strategy maturity and P/E Ratio in 2009.

2010 - There is no statistically significant correlation between Risk Strategy maturity and P/E Ratio in 2010.

6.5.3 P/E Ratio and Risk Protocol Maturity

2008 - There is no statistically significant correlation between Risk Protocol maturity and P/E Ratio in 2008.

2009 - There is no statistically significant correlation between Risk Protocol maturity and P/E Ratio in 2009.

2010 - There is no statistically significant correlation between Risk Protocol maturity and P/E Ratio in 2010.

6.5.4 P/E Ratio and Total ERM Maturity

2008 - There is no statistically significant correlation between Total ERM maturity and P/E Ratio in 2008.

2009 - There is no statistically significant correlation between Total ERM maturity and P/E Ratio in 2009.

2010 - There is no statistically significant correlation between Total ERM maturity and P/E Ratio in 2010.

6.5.5 Findings for Proposition 5

The lack of any correlations in earnings suggests that the future expectation of earnings in relation to current earnings cannot be explained by enterprise risk management maturity.

6.6 Discussion of Results for Proposition 6

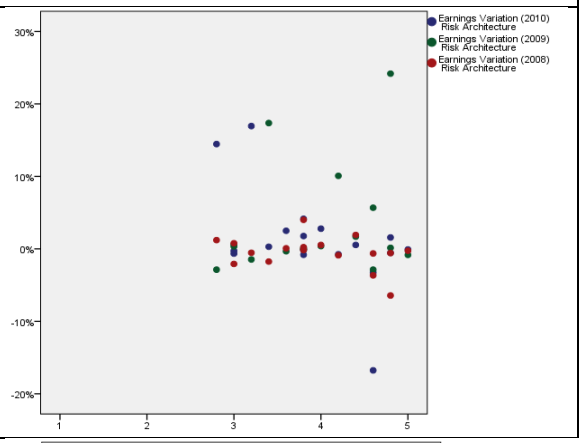
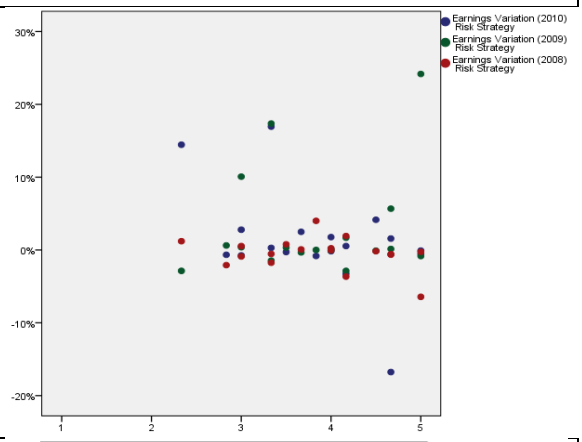
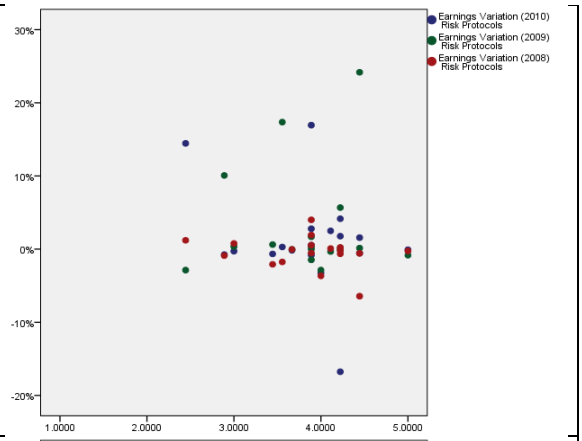
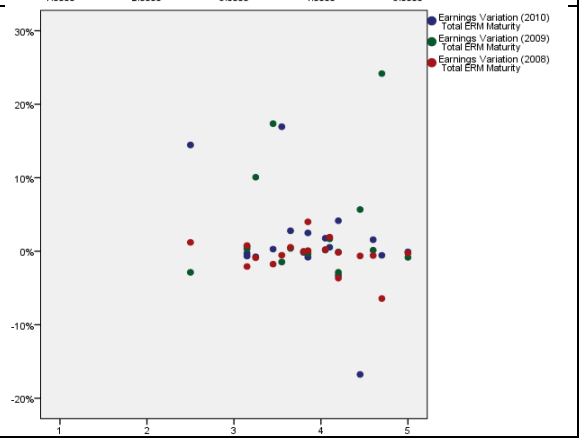
There is a positive correlation between organisations with mature ERM programs and earnings in an economic downturn.

The Earnings of an organisation are a reflection of the management decisions taken; of all the six proposition, earnings is the most real in terms of the effect that an economic downturn would have on an organisation.

If management identify risks correctly, ERM maturity should be able to protect the organisations against the worst of a downturn as compared to organisation who were not identifying their risks.

Table 26 below shows the correlation of Earnings Variation and each of the Enterprise Risk Management Maturity principles (Risk Architecture, Risk Strategy, Risk Protocol and Total ERM Maturity).

Table 26: Proposition 7 (Earnings) Correlation Analysis

CORRELATION	YEAR	CORR	P-VALUE	PLOT
Figure 33: Correlation of Earnings and Risk Architecture Maturity	**2010**	-0.359	0.143	
	2009	0.202	0.423	
	2008	-0.317	0.2	
Figure 34: Correlation of Earnings and Risk Strategy Maturity	**2010**	-0.244	0.329	
	2009	0.039	0.877	
	2008	-0.209	0.405	
Figure 35: Correlation of Earnings and Risk Protocol Maturity	**2010**	0.017	0.948	
	2009	-0.066	0.796	
	2008	0.218	0.384	
Figure 36: Correlation of Earnings and Total ERM maturity	**2010**	-0.174	0.491	
	2009	0	1	
	2008	-0.237	0.344	

6.6.1 Earnings and Risk Architecture Maturity

2008 - There is no statistically significant correlation between Risk Architecture maturity and Earnings in 2008.

2009 - There is no statistically significant correlation between Risk Architecture maturity and Earnings in 2009.

2010 - There is no statistically significant correlation between Risk Architecture maturity and Earnings in 2010.

6.6.2 Earnings and Risk Strategy Maturity

2008 - There is no statistically significant correlation between Risk Strategy maturity and Earnings in 2008.

2009 - There is no statistically significant correlation between Risk Strategy maturity and Earnings in 2009.

2010 - There is no statistically significant correlation between Risk Strategy maturity and Earnings in 2010.

6.6.3 Earnings and Risk Protocol Maturity

2008 - There is no statistically significant correlation between Risk Protocol maturity and Earnings in 2008.

2009 - There is no statistically significant correlation between Risk Protocol maturity and Earnings in 2009.

2010 - There is no statistically significant correlation between Risk Protocol maturity and Earnings in 2010.

6.6.4 Earnings and Total ERM Maturity

2008 - There is no statistically significant correlation between Total ERM maturity and Earnings in 2008.

2009 - There is no statistically significant correlation between Total ERM maturity and Earnings in 2009.

2010 - There is no statistically significant correlation between Total ERM maturity and Earnings in 2010.

6.6.5 Findings for Proposition 5

The lack of any correlations in Earnings suggests that the financial performance (earnings after tax) cannot be explained by enterprise risk management maturity.

6.7 Summary of Discussion of Results

The proponents of Enterprise Risk Management argue that if every part of an organisation is identifying the risks that affect their objectives, they should be better protected as an organisation against economic downturns than organisations with low ERM maturity. The results do not holistically confirm this opinion.

While the literate in Chapter 2 (page 5) led me to believe that we would see a correlation in total enterprise risk management maturity, the results have led me in a different direction.

The results indicate Risk Architecture does protect Shareholder Return (Figure 10) in the year that an economic downturn occurs, which in this research was 2008.

The results also indicate that Risk Architecture does protect Shareholder Value (Figure 18) in the year that an economic downturn occurs, which in this research was 2008.

Given that shareholder return variation (SRVAR) is calculated as an equal combination of share price variation (SPVAR) and dividend yield variation (DYVAR) then it should not come as a surprise that shareholder return and share price variations show a very similar co-efficient during 2008.

This is very relevant to both shareholder and management alike; while shareholders are interested in the protection and growth of their capital, management are interested in the consistent return they provide to their shareholders, senior management are frequently remunerated by performance in this criteria.

Risk Management is still a young profession, and while the authors of the standards (COSO, 2004) and (ISO 31000, 2009) refer to the risk management process being inclusive of both upside (opportunities) and downside (threats) risks, most organisations still practise risk as the mitigation of the threats that risks pose. If this is correct, then the goal of risk management in these organisations is protection from economic downturns (as seen in 2008) rather than opportunities seen in the economic recovery of 2009 & 2010. This is possibly why one of the risk maturity categories showed a positive correlation (with share price and shareholder return) only in the single year that the downturn occurred, 2008.

The results show us the only one of the 4 categories (risk architecture, risk strategy, risk protocol and total risk maturity) may influence shareholder value; this category, risk architecture, will be discussed in more detail in 6.7.1 below.

6.7.1 Risk Architecture

The results indicate that risk architecture maturity does effect the share price, and therefore shareholder return/value, during an economic downturn in that shareholders lose less value of their capital.

When the economic downturn occurred (2008), the market considered the future earnings of those organisations with higher risk architecture maturity to be higher, as compared with organisation with lower risk architecture maturity.

Of particular interest are the components of Risk Architecture maturity, because this is the only category that showed such a correlation. The significant components of Risk Architecture maturity are:

- Board Responsibilities being defined
- Dedicated Risk committee
- Use of external experts for risk advice
- Measurement of Risk Maturity
- Multiple Assurance Providers

6.7.1.1 Board Responsibility

The requirement in Table 4 that there is a statement produced that sets out risk responsibilities and lists the risk-based matters reserved for the Board. This shows that risks are escalated to the highest level in the organisation and that the board is accountable for risk management holistically; it effectively sets the tone from the top.

6.7.1.2 Dedicated Risk Committee

The requirement in Table 4 is that risk management responsibilities are allocated to an appropriate management committee; the question was in line with KING III's recommendation of a separate risk committee. Such a dedicated committee shows the commitment of the organisation to the practise of aligning organisations objectives and its risk management processes.

6.7.1.3 Use of External Expertise

The requirement in Table 4 is that arrangements are in place to ensure the availability of appropriate competent advice on risks and controls. While organisations are best placed to understand their market, they are not always best placed to understand the best way to approach the identification and treatment of risks. Such external advice is therefore valuable to get an independent perspective of how risk management should be conducted in the organisation.

6.7.1.4 Risk Aware Culture

The requirement in Table 4 is that a risk aware culture exists within the organisation and actions are in hand to enhance the level of risk maturity. If an organisation measures and rewards its staff on the level of risk maturity, it is likely that this will become a strong focus and driving force to achieve it. By measuring the risk aware culture it sends a message to the organisation that risk management is important.

6.7.1.5 External Assurance Providers

The requirement in Table 4 is that the organisation has sources of risk assurance for the Board that have been identified and validated; the question asked is if the organisation utilised external assurance providers. The purpose of providing assurance to the board is that they board can rely on that information, but often internal assurance providers (management and internal audit) cannot be independent. External assurance providers such as quality assurance firms and external auditor offer an invaluable

service of independent information as to the organisations state of risk management and risk maturity.

7. Conclusion

7.1 Introduction

The purpose of this research has been to see if a relationship exists between Enterprise Risk Management (ERM) maturity and shareholder value in the economic downturn of 2008 – 2010.

The relevance of this research was established in Chapter 2 with a number of recent studies alluding to the relationship between ERM and shareholder value, as well as globally applicable codes and standards having been published on the topic. In a South African context, the KING III code of corporate governance recommends the application of ERM principles throughout the organisation.

The results of this research add to the growing number of publications that analyse ERM not only as a process to avoid the downside of economic downturns, but also a process that can maximise the upside of opportunities.

This research has been practically written to be easily replicated and the maturity analysis for ERM (Table 4 on page 35) is something that organisations can apply immediately independent of their industry or nationality. Any senior executive reading this research should be asking themselves "does my organisation score well on this maturity scale".

The researcher is of the opinion that the data collected was representative of the Johannesburg Stock exchange (JSE) and that no bias in financial data exists.

7.2 Risk Architecture vs. ERM Maturity

A significant finding was that in the year that the economic downturn started, being 2008, those organisations with a high level of Risk Architecture maturity offered a better shareholder return than those with a low level of Risk Architecture Maturity; this was mainly because of the share price of those organisation whose Risk Architecture was higher, dropped less than those with a low level of Risk Architecture Maturity.

Share price reflects the markets expectations of future earnings, and is therefore significantly influenced by the impression the company provides to the market, as well as its historic performances. Since there was no correlation found between the Price to Earnings (P/E) ratio and shareholder value, or the actual Earnings and shareholder value, it means that the good performance of the share price reflects that the market rewarded strong Risk Architecture.

Holistically, this research was not able to reject the null hypotheses of most of the propositions and this research was therefore unable to confirm that Enterprise Risk Management maturity has an effect on shareholder value. This is partly because the immaturity of ERM means it is a downside avoidance process in most companies, rather than also being an upside maximisation process. This being the case, the research was ambitious in attempting to analyse the effect of ERM on shareholder value in a period where markets both fell and rose.

7.3 Checking the Research against the Aims

The aim of the research was to establish if there is value to the shareholder in company performing ERM activities. Value to the shareholder was measured and defined in Table 27 below.

Table 27: Summary of Research Aims

Unit of Analysis	Aim of Research
1 Shareholder Return	Is the total financial return to the shareholder effected by ERM maturity?
2 Share Price Volatility	Is the share price of companies with mature ERM practises less volatile?
3 Share Price	Does mature ERM affect the market's opinion of the company and its future earning potential?
4 Dividend Yield	Do companies with more mature ERM processes maintain their dividend in an economic downturn?
5 Price to Earnings Ratio	Does mature ERM processes affect the P/E multiple?
6 Earnings	Is the earnings of companies with mature ERM less effected by an economic downturn?

The research methodology followed has allowed the researcher to accurately retrieve and analyse all the relevant financial data to achieve the aims of the research; only shareholder return and share price showed a correlation to ERM maturity, and that was in 2008, being only one of the three years that were analysed.

7.4 Research Limitations

The following are considered limitation of this research:

1. **No. of respondents** – The number of respondents being 19 is low. The researcher is of the opinion that survey responses were low because of the sensitive nature of the questions.
2. **Industry variations** – The industries were widely represented but in many cases only a single company was represented per industry. There was no way for the researcher to perform comparisons within a given industry; moreover, because the impact of the economic downturn varied on differing industries, there is no way to normalise for this variable.
3. **Multiple Economic Cycles** – The researcher recognises that analysing data over a three year period that was one of the most volatile economic periods on record was ambitious. The research could potentially offer greater value when looking only a single period or event.
4. **ERM Maturity** – The lack of published models on ERM resulted in the researcher developing a unique maturity evaluation which, while based on extensive literature, may have flaws that can only be highlighted when the ERM profession is more mature.

7.5 Potential Areas of Future Research

The researcher has identified four areas of potential future research as follows:

1. **Board opinion as to the value of ERM** – A qualitative study would explore the value that board members feel ERM offers to the various stakeholders of the organisation
2. **ERM implementation and value to shareholders** – This research has identified that the architecture of a company's ERM process effects shareholder value, but much of the literature, and individual company efforts, is focussed on the strategy and implementation of ERM and not the architecture.
3. **Long Term Benefits of ERM** – This research studies ERM in an economic downturn and therefore cannot be representative of ERM during all economic cycles. A relevant topic to research would be the long term benefits of ERM over a decade or more.
4. **Can ERM be used to manage opportunities** – ERM is still perceived as a mitigation strategy for the downside of risk, it would be relevant to research whether ERM can add value to the upside of opportunities as implied by much of the literature.

8. Reference List

Alviniussen, A., & Jankensgård, H. (2009). Enterprise Risk Budgetting:Bringing Risk Management into the Financial Planning Process. *Journal of Applied Finance*(1 & 2), 178-192.

Bainbridge, S. M. (2009, 06 29). Caremark and Enterprise Risk Management. *The journal of corporate law*, 967-990.

Ballou, B., & Heitger, D. L. (2005, Winter). A Building Block for implementing COSO's Enterprise Risk Management Integrated Framework. *Management Accounting Quarterly, 6*(2), pp. 1-10.

Beasley, M., Chen, A., Nunez, K., & Wright, L. (2006, 03). Working hand in hand: Balanced Scorecards and Enterprise Risk Management. *Strategic Finance*, pp. 49-55.

Beasley, M., Pagach, D., & Warr, R. (2008, Summer). Information Conveyed in Hiring. *Journal of Accoutning, Auditing and Finance, 23*(3), 311-332.

Berry, A. J. (1980). Control, Organising and Accounting. *Accounting, Organizations and Societ, 5*(2), 231-244.

COSO. (2004). *Enterprise Risk Management - Integrated Framework: Executive Summary.* Vancouver: Committee of Sponsoring Organizations of the Treadway Commission.

Dash Wu, D., & Olson, D. L. (2009, 06). Enterprise risk management: small business scorecard analysis. *Production Planning & Control, 20*(4), pp. 362-369.

Demidenko, E., & McNutt, P. (2010). The ethics of enterprise risk management as a key component of corporate governance. *International Journal of Social Economics, 37*(10), 802-815.

Dickinson, G. (2001, 07). Enterprise Risk Management: Its origins and conceptual foundation. *The Geneva Papers on Risk & Insurance, 26*(3), pp. 360-366.

Garcia, V. (2005, 12). Enterprise Risk Management in Financial Services: From Vision to Value. *Bank Accounting & Finance*, pp. 3-6.

Gordon, L. A., Loeb, M. P., & Chih-Yang, T. (2009). Enterprise risk management and firm performance: A contingency perspective. *Journal of Accounting and Public Policy, 28*, 301-327.

Hair, J. E., Black, W. C., Babin, B. J., Anderson, R. E., & Thatham, R. L. (2006). *Multivariate Data Analysis* (Sixth ed.). New Jersey: Pearson Prentice Hall.

Hoyt, R. E., Moore, D. L., & Liebenberg, A. P. (2008). The Value of Enterprise Risk Management: Evidence from the U.S. Insurance Industry. *The society of actuaries*, 1-22.

ISO 31000. (2009). *Risk management — Principles and guidelines ISO 31000:2009(E).* Geneva: International Standards Organisation.

McDaniel, C., & Gates, R. (2006). *Marketing Research Essentials.* New Jersey: John Wiley & Sons, Inc.

McDonald, C. (2010, 04 26). Few firms see themselves as "advanced" on use of Enterprise Risk Management. *National Underwriter - Property & Casualty*, 25.

Muzzy, L. (2008, 10). Approaching Enterprise Risk Management. *Financial Executive*, pp. 59-61.

Nelson, M., & Ambrosini, J. (2007, 02). Enterprise Risk Management and Controls-Monitoring Automation Can Reduce Compliance Costs. *Bank Accounting and Finance*, 25-30.

Norusis, M. J. (2005). *SPSS 14.0 Statistical Procedures Comapnion.* New Jersey: Prentice Hall.

Ramamoorti, S., Weidenmier Watson, M., & Zabel, M. (2008, 10). Engineering Value into Enterprise Risk Management. *Internal Auditor*, pp. 53-59.

Sabatini, F., & Ingram, D. (2010, 06). Betting versus Enterprise Risk Management. *Financial Executive*, p. 61.

Schepers, J. M. (undated). The power of multiple battery factor analysis in overcoming the effects of differential kewness of variables. *Unpublished*.

Shimpi, P. (2010, 01). Financial Crisis Exposes Need For All To Adopt Enterprise Risk Management. *National Underwriter Property & Casualty*, pp. 22-23.

Wiklund, D., & Rabkin, B. (2009, 03). The balance shee persepctive of Enterprise Risk Management. *Financial Executive*, pp. 54-56.

9. Appendices

9.1 Survey Questionnaire for ERM Maturity

Appendix 1: Survey questionnaire for Enterprise Risk Management Maturity

No.	Question	5	4	3	2	1
1	Does the board have defined responsibilities in the Risk Management process	Yes, Individual responsibilities identified	Yes, Generic responsibilities for Board Members	Undefined, but Board know their responsibilities	Non-board members present risk information only	Risk is not discussed at Board level
2	Is there a committee overseeing Risk Management	Yes, Risk Management committee	Yes, Audit & Risk Committee	Yes, Audit Committee	Yes, committee other than Risk or Audit	No, there is no committee responsible for Risk
3	Does the organisation use external experts to advise on risks and controls	Yes, Board, committee and Management use external experts	Yes, Board and committee user external experts	Yes, Board or committee uses external experts	External expertise is in the form of external audits	No external expertise is utilised

4	Is there a process of measuring Risk Maturity across the organisation	Yes, Risk Maturity is measured at least annually by way of a survey	Yes, Risk Maturity is measured at least annually by an expert	Yes, Risk Maturity is measured occasionally	Risk Maturity is estimated based on the results/reports offered from management	Risk Maturity is not measured at all

5	Does the organisation have multiple assurance providers that report to the board	Yes, Internal Audit, External Audit + 1 Other	Yes, Internal Audit + External Audit	Yes, External Audit + 1 Other	Yes, Internal Audit + 1 Other	No, only one of Internal Audit, External Audit + Other

6	Is there a policy that defines the appetite, culture and philosophy or Risk management.	Yes, every senior manager is trained on it	Yes, every MD/BU Manager is trained upon it	Yes, Risk Management are trained upon it	Yes, only the board are aware of it	No, there is no policy

7	Does the policy include key dependencies for success and matters that should be avoided	Yes, both Key Dependencies and matters for avoidance are included; customised to the specific division/BU	Yes, only one of Key Dependencies or matters for avoidance are included; customised to the specific division/BU	Yes, both Key Dependencies and matters for avoidance are included	Yes, only one of Key Dependencies or matters for avoidance are included	No, neither Key Dependencies or matters for avoidance are included

8	Does the organisation define its Objectives and identify risks in the context of those objectives	Yes, Objectives are defined and Risks are identified in the context of objectives	Yes, Objectives are defined and Risks are linked to one or more objectives	Yes, Objectives are defined but not linked to risks in any way	Yes, Objectives defined but Risk Management are not aware of them	No objectives identified
9	Does the organisation distinguish between a risk and a risk that is materially significant (i.e. Key Risk or Strategic Risk)	Yes, a Strategic/Key Risk assessment is done with the board	Yes, a Strategic/Key Risk assessment is done without the board	Yes, a Strategic/Key Risk is differentiated by its Risk Rating/Priority and relevance to the organisation	Yes, a Strategic/Key Risk is differentiated by its Risk Rating/Priority only	Risks are not identified as key or strategic

10	Does the organisation identify key risk indicators	Yes, KRI are linked to risks to proactively prevent realisation of risk and each KRI is assessed and monitored regularly	Yes, KRI are linked to risks to proactively prevent realisation of risk	Yes, KRI are identified but not linked to risks	Yes, KRI are identified but not as part of the Risk Management process	No KRI are identified
11	Is there a risk management action plan in the organisation	Yes, it is implemented down to management level and reported by management	Yes, it is implemented down to management level and tracked by Internal Audit	Yes, it is implemented down to management level by only tracked where a risk has realised	Yes, it is in place and reported by and tracked by Risk Management	No, there is no Risk Management Action Plan

12	Does the organisation have a Risk Management framework that defines the criteria upon which a risk must be assessed (probability/likelihood, impact/consequence, cause, consequence, etc)	Yes, assessment done by management and the scales are customised to the division/BU	Yes, assessment done by management and scales are standardised	Yes, assessment done by Risk Management team and scales are customised to the division/BU	Yes, assessment done by Risk Management team and scales are standardised	No, there is no Risk Management framework in place

13	Does the organisation conduct regular Risk assessments	Yes, Risk assessments done at Division/BU level and is continually updated by management	Yes, Risk assessments done at Division/BU level quarterly	Yes, Risk assessments done at Division/BU level annually	Yes, Risk assessment done only at organisation level annually	No, there are no risk assessments at any level

14	Does the organisation record these electronically (RMIS = Risk Management Information System)	Yes, each manager of BU/Division is responsible for update on the RMIS	Yes, the Risk Management team are responsible for the update of the RMIS	Yes, Risk Assessments done in word/excel and then transferred into the RMIS	Yes, Risk Assessments captured in word/excel	No electronic recording of Risk Assessments

15	Are Risk assessments utilised as part of the decision making process	Yes, every decision is made after considering the risk assessment	Yes, only significant decisions are made after considering the risk assessment	Yes, only at the most senior levels of an organisation are decisions made after considering the risk assessment	Yes, only for specific project or capital expenditure are decision made after considering the risk assessment	No, Risks are not considered as part of making decisions

16	Does the framework include the identification of Risk responses	Yes, every risk required a risk response and an action plan	Yes, every risk required a risk response or an action plan	Yes, every risk requires a risk response only	Yes, only significant risks require a risk response	No risk response is required

17	Does the organisation track the incidents where risks are realised	All incidents are tracked in a centralised database and linked to risks	Certain categories of incidents are tracked and linked to risks	All incidents are tracked but not linked to risks	Certain categories of incidents are tracked but not linked to risks	No incident tracking is in place

18	Does the organisation have DR and BCM plans in place	DR & BCM plans are in place and champions identified	DR & BCM plans in place and centralised responsibility	DR & BCM plans in place, but not published or actioned	DR & BCM in place but not considered part of Risk Management	No DR or BCM plans in place
19	Does the organisation audit the efficiency and effectiveness of the controls	Yes, all controls identified in the Risk Assessment are audited on the basis of an audit plan coverage period	Yes, only key controls identified in the Risk Assessment are audited on the basis of an audit plan coverage period	Yes, all controls are audited based on audit libraries	Yes, only key controls are audited based on audit libraries	No, there are no controls audited

20	How many of the items below are included in mandatory reports to the Board: • Risk appetite, tolerance and constraints • Risk architecture and risk escalation procedures • Risk aware culture currently in place • Risk assessment arrangements and protocols • Significant risks and key risk indicators • Critical controls and control weaknesses • Sources of assurance available to the Board	6 or more	5	4	3	2 or less