AN EXAMINATION OF VALUE ENHANCING ENTERPRISE RISK MANAGEMENT IMPLEMENTATION FRAMEWORK FOR MALAYSIAN PUBLIC LISTED COMPANIES

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ABSTRACT

Enterprise risk management or ERM is fast ascending the corporate agenda globally. Its relevancy and popularity as a management technique are abetted by the changing business practices and burgeoning regulatory requirements on risk management. ERM is defined as the process of identifying and analyzing risk from an integrated, company-wide perspective in a structured and disciplined approach in aligning strategy, processes, people, technology and knowledge with a purpose of evaluating and managing the uncertainties facing the enterprise as it creates value. ERM essentially lays concern for managing the firm's specific risk apart from the systematic risks.

However, the neo-classical finance theory (NCFT) postulates that managing firm-specific risk is irrelevant. Nonetheless, this notion is in stark contrast to the phenomenon of increased acceptance of ERM by industry practitioners. As such, this thesis attempts to propose an ERM implementation framework to theorize a model that captures the causal relationships of the risks that are strategically associated with the firms' business performance and the cost of capital, e.g. risk premium.

This thesis highlights the notion of managing firms' unsystematic (specific) risk via an ERM implementation framework that leads to the enhancement of shareholders' value. The mechanism through which the firms' value enhancement takes place is theorized by a strategic conceptualization of risk premium model. The model cites managing the firm's three classes of unsystematic risk, namely tactical risk, strategic risk, and normative risk. The specific aims of this thesis are fourfold: (i) to examine the depth of penetration of ERM practices among the public listed

companies in Malaysia; (ii) to examine how an effective implementation process of ERM will bring about value-enhancing outcome to Malaysia public listed companies (PLCs); (iii) to analyze the value proposition hypotheses of corporate risk management as the determinants for ERM practices; and (iv) to investigate the validity of the theorized value creation transmission mechanism of the proposed ERM framework via the strategic conceptualization of risk premium model.

The data is collected through questionnaires survey from 128 PLCs on the Malaysian stock exchange. Variables in the questionnaire are measured in 5-point Likert's scale. The analyses encompass factor analysis and structural equation modeling (SEM). Outcomes of the factor analysis provide inputs (the measurement model) for the SEM analysis. The SEM validates the theorized causal relationships among the three constructs, i.e. *ERM implementation challenge*, *ERM implementation intensity*, and *perceived ERM benefit measures*. The modified model incorporates a second-order factor model which presents improved overall goodness-of-fit values than the proposed model. Apart from that, the analytic also comprises bivariate correlation analysis of hypotheses testing in relation to the various aspects of: (i) the **value maximization theory of ERM practices;** and (ii) the **value creation transmission mechanism** of the proposed ERM implementation framework.

The analysis results conclude the following: (i) that all causal relationships (structural model) under SEM examination indicate significant parameters; (ii) that ERM implementation has significant positive associations with value maximization theories of risk management; (iii) that ERM implementation has significant positive effects in reducing the firm's *tactical* and *strategic* risks with the consequence of lowering the firm's risk premium.

ABSTRAK

Pengurusan risiko enterpris (ERM) adalah sebuah konsep pengurusan baru yang mendapat perhatian dalam agenda korporat pelbagai pihak di seluruh dunia. Perubahan yang sedang berlaku dalam pengendalian perniagaan serta keperluan-keperluan regulatori menampakkan konsep ERM sebagai satu teknik pengurusan yang semakin relevan and popular. ERM adalah process mengenalpasti dan menilai risiko dari perlbagai perspektif dalam sebuah organisasi. Ia adalah pendekatan yang berstruktur dan berdisiplin dalam mengatur strategi, proses, sumber manusia, teknologi dan ilmu dengan tujuan untuk menilai dan mengurus sesuatu yang diluar jangkaan justeru memberi nilai kepada organisasi. ERM memberi penekanan kepada pengurusan risiko yang firma-spesifik selain risiko sistematik.

Walau bagaimanapun, teori neo-classical finance (NCFT) mengandaikan cara pengurusan risiko firma-spesifik seperti yang dipelopori ERM sebagai sesuatu yang tidak relevan. Namun pendapat ini agak bertentangan dengan fenomena menerimaan pihak industri yang semakin tinggi terhadap konsep baru ini. Oleh itu, tesis ini ingin mencadangkan sebuah pendekatan rangkaan (framework) untuk memberi penjelasan teori mengenai hubungan risiko yang secara strategiknya dan dihubungkaitkan dengan pencapaian perniagaan sesebuah firma serta kos risikonya.

Tesis ini mencadangkan penerapan konsep ERM dalam pengurusan risiko firma-spesifik untuk menambah nilai kepada pemegang saham sesebuah firma melalui mekanisma yang strategic melalui model kos risiko (risk premium). Model ini menjelaskan tiga kategori risiko firma-sistematik; yakni risiko taktikal, risiko strategik dan risiko normatif. Objektif tesis ini dibahagikan kepada empat: (i) mengkaji sejauh mana ERM diterima oleh firma tersenarai di Bursa Malaysia, (ii)

meniliti keberkesanan konsep ERM dalam menaiktambahkan nilai korporat firma tersenarai (iii) menilai hipotesis penambahan nilai korporat melalui perlaksanaan ERM dan (iv) mengkaji kesahihan mekanisma penjanaan nilai melalui perlaksanaan ERM melalui model kos risiko strategik.

Pengumpulan data adalah melalui survei dari 128 firma tersenarai di Bursa Saham Malaysia. Hasil dari analisa faktor memberi pengisian kepada analisa Structural Equation Modeling (SEM). Analisa SEM membuktikan kewujudan hubungan 'causal' antara ketiga-tiga konstruk: *ERM implementation challenge, ERM implementation intensity dan perceived ERM benefit measures.* Model penambahbaikan melalui factor turutan kedua (*second order factor)* memperhalusi model yang sebelumnya. Selain daripada itu, analisis juga merangkumi analisa *bivariate correlation* dengan mengambil kira (i) teori penambah nilai maksima perlaksanaan ERM, dan (ii) mekanisma penyaluran nilai model ERM yang dicadangkan. Hasil kajian menunjukkan (i) kesemua hubungan 'causal' (model structural) di bawah ujian SEM menunjukkan parameter yang siknifikan (ii) perlaksaan ERM memberi kaitan yang positif dalam mengurangkan *cost of financial distress, lowering cost for external financing, improving firm's credit rating, receiving reward from equity market, reducing informational asymmetries,* dan *reducing agency problem*; (iii) implementasi ERM memberi kesan yang positif dalam mengurangkan risiko taktikal dan risiko strategik sekali gus mengurangkan kos risiko firma.

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DEDICATION

This thesis is dedicated to my beloved mother – Madam *Quek Baby*, wife – *Serene Chang*, daughter – *Xin Jie*, son – *Yie Shuen*, other family members and friends for their love, support, and encouragement during the course of my study. I dedicate this thesis specially to my beloved late father, Mr. *Lai Tau Lin*, *JP., AMN., PJK.* (1942 -2006).

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LIST OF ABBREVIATIONS

AGFI	Adjusted GFI
AIC	Akaike Information Criterion
AMA	Advanced Measurement Approach
AMOS	Statistical Software Owned by SPSS Inc.
AS/NZS	Australian and New Zealand Risk Management Standards
BIA	Basic Indicator Approach
BPR	Business Process Reengineering
CAPM	Capital Asset Pricing Model
CEO	Chief Executive Officer
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CFO	Chief Financial Officer
CFT	Classic Finance Theory
CLS Model	A Dynamic Framework of a Firm's Risk Premium Developed by Chatterjee, Lubatkin, and Schulze
Code	The Malaysian Code on Corporate Governance
COO	Chief Operating Officer
COSO	Committee of Sponsoring Organizations of the Treadway Commission
CRM	Corporate Risk Management
CRO	Chief Risk Officer
EFA	Exploratory Factor Analysis
EPS	Earning-per-share
ERM	Enterprise Risk Management
EWRM	Enterprise-wide Risk Management
FTSE	The Financial Times and the London Stock Exchange
GDP	Growth Domestic Product
GFI	Goodness-of-Fit Index
GM	General Manager
IFI	Incremental Fit Index
IPO	Initial Public Offering
KLCI	Kuala Lumpur Composite Index
KLSE	Kuala Lumpur Stock Exchange
KPI	Key Performance Indicator
KRI	Key Risk Indicator
MARC	Malaysian Rating Corporation Berhad
MD	Managing Director
MFT	Modern Financial Theory
MPT	Modern Portfolio Theory
NCFT	Neo-classical Finance Theory
NFCs	Non-finance Companies
NFI	Normed Fit Index
NNFI	Non-Normed Fit Index
MLE	Maximum Likelihood Estimation

NPV	Net Present Value
OHSAS	Occupational Health & Safety Advisory Services
PE	Parameter Estimate
PERT	Program Evaluation and Review Technique
PGFI	Parsimony Goodness of Fit Index
PLCs	Public Listed Companies
PNFI	Parsimonious Normed Fit Index
RAM	Rating Agency Malaysia
RBV	Resource-based View
RCD	Reversible Convertible Dent
RFI	Relative Fit Index
RMSEA	Root Mean Square Error of Approximation
RMSR	Root Mean Square Residual
RNI	Relative Noncentrality Index
SC	Securities Commission
SOP	Standard Operating Procedures
SOX	Sarbanes-Oxley Act
SEM	Structural Equation Modeling
SRM	Strategy Risk Management
TLI	Tucker-Lewis Index
TSA	The Standardised Approach
TSE	Toronto Stock Exchange
VC	Vice President

LIST OF APPENDICES

QUOTATIONS ON RISK MANAGEMENT

"To get profit without risk, experience without danger, and reward without work, is as impossible as it is to live without being born"

- A.P. Gouthev

危[1] 机[2]

wei *ji*

The Chinese word "crisis" is made up of two characters – one is *danger*[1], the other one is *opportunity*[2]

He who knows the meaning of risk management shall have no qualms encountering risk in life

- Fong-Woon Lai

CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

In an organization, the management goal is to maximize shareholder's wealth. Toward this end, management operational maneuver typically has been trying to improve the valuation of the company's shares through delivering strong company earnings (Matsusaka, 2001). In the process however, managers have to deal with a single most crucial element in corporate management, i.e., risk. Risk exists everywhere as far as business engagement is concerned. This is because risk of adverse consequences are inherent in all business activities. Moreover, dynamic enterprises inevitably create new risks in their quest to generate value for their shareholders.

The axiom in *finance* discipline is that it is only taking on risk that one can expect an investment payoff that is above the risk-free rate. Unless one is contented with earning just a risk-free return in his investment venture, one cannot avoid taking risk. Nonetheless, no one is satisfied with investments that are yielding merely risk-free returns. As such, when one takes on risk, it is imperative to manage this risk. A proper risk management process entails the firm to first identify what risks to take and then accurately quantify and measure them. This will form the pre-requisite for the firm to base its rewards on risk adjusted performances. These crucial processes of deciding which risks, and to what magnitude are core managerial functions embodying corporate risk management. Hence, corporate risk management ensures that all significant risks are understood and therefore, prioritized. Information on risk obtained as a result of active engagement of risk management can be organized for an effective decision making in investment, capital budgeting, performance, and reward evaluations.

1.2 THE HISTORY OF CORPORATE RISK MANAGEMENT

Historically, risk management has been a narrow insurance-based discipline. Its activities involved transferring insurable risks faced by corporations to third parties by way of engaging in insurance contracts. Insurance policies are used to hedge against pure risk, i.e. those situations that involve only the chance of loss or no loss such as the occurrence of fire and flood (Vaughan, 1997). Uninsurable risks are often ignored and neglected. Over time, enterprises' concept of risk management revolves around handling financial related risks such as liquidity, interest rate, foreign exchange fluctuation and credit risk. Financial risks have now been given great emphasis since they are by and large, the most direct and significant impact on the enterprises' bottom lines. Formulating hedging strategies using financial derivatives such as futures, forward, option, and swap contracts are the key functions of relevant managers who are tasked to address those financial risks. Nonetheless, corporate risk management has since evolved to be more macro and holistic in nature, addressing risk issues encompassing all aspects in an enterprise's business activities. Corporations have begun to realize the fast changing sphere of risk game and its multi-dimensionality. The conventional wisdom of assessing risks pertinent to the business and the paradigm in managing those risks have changed tremendously. This is evidenced from the recent insurance crisis which has prompted firms to look to alternative means of controlling risk exposure (Thompson, 2003).

The risk game in business is fast changing. Almost anything has become a risk factor that will have a potent, direct, and far reaching impact on business. For instance, risks have also emerged from the operations side of business processes. More often than not, they are as significant, if not more, as those coming from the financial side of the business transactions. These risks range from anything such as a computer meltdown, human error or fraud, to a terrorist attack (Thompson, 2003). This expanded spectrum of risks in the business activities vindicates its existence through a spate of corporate scandals and financial mismanagement incidents that had started to be uncovered since the end of 2001. To name a few, these incidents include the systematic accounting fraud and financial irregularities seen in US corporations such as Enron, Worldcom, and Tyco; Italian firm Parmalat; and Chinese firm China Aviation Oil. Enron, Worldcom, and Barring have since gone bankrupt. The dangers poised by these risks that were not looked seriously into and addressed by the traditional risk management efforts are in fact, clear and present. In effect, it will not be a surprise if some would see these risks as much more important these days than the financial risks where the likelihood for them to occur is rather high. Thus, it is high time to incorporate a more dynamic approach in corporate risk management to heed the new challenges brought by the constant and fierce changes in the business operating environment.

1.3 RISK MANAGEMENT IN BANKING SECTOR

In the regulated banking fraternity, the drafting of the New Capital Accord (Basel II) by the Bank for International Settlements, which stipulates banks to also allocate capital reserve for operational risk, beyond and above the traditional market and credit risks, signifies a change in risk management mindset in the international banking industry. The mindset sees a shift from one that merely looks at a short term transactional financial performance, towards one that sees a broader perspective that includes operational risk management. Apart from aligning the reserving of regulatory capital to that of economic capital, Basel II also requires financial institutions to disclose greater risk information to investors and a more explicitly set standards for internal risk management processes (Belmont, 2004). The essence of the Basel II requirements is for banks to invest more rigorously in their risk management mechanism so as to have a more advanced risk measurement modeling. It allows banks to self determine the amount of regulatory capital needed for the level of their risk exposures. Having an effective risk management regime will result in banks needing a lower regulatory capital requirement and having better strategic decision making in capital budgeting, capital structuring, and capital allocation (Belmont, 2004). This ultimately will lead to a better risk-adjusted return on capital and a value creation process for shareholders.

There are 3 levels of compliance intensity to the Basel II accord. The intensity levels involve the complexity and sophistication in measuring and interpreting various types of risk for the purpose of banks' risk capital charge. The highest level of compliance is the Advanced Measurement Approach (AMA), followed by the Standardised Approach (TSA), and lastly the Basic Indicator

Approach (BIA). In the present local banking scene, Malaysian banks are in the midst of adopting the Standardised Approach. In comparison, most mature banking countries in the Asia Pacific region such as Australia, Hong Kong, Japan, New Zealand, Singapore South Korea and Taiwan have generally adopted the AMA (Starbiz, 2008a). The adoption of AMA option allows banks to use their internal models to calculate their regulatory capital holdings. This is a form of favorable treatment by regulators in comparison to the conventional way where regulators stipulate bank's regulatory capital requirement. According to Dr John Lee, head of ASPAC financial risk management for KPMG Business Advisory Sdn Bhd, most local banks are aiming to be compliant to AMA by 2010. If they miss the dateline, the next target will be 2013 (Starbiz, 2008). Compliant to Basel II regulations is an effort by the banking fraternity to extend its conventional market and credit-based risk management program to one that is more enterprise-wide based. The stipulation and initiatives under Basel II risk management requirements are often seen by the industry as an approach to implement the concept of *enterprise risk management* (ERM) in the banks' organization. They reckon that implementing ERM program is the answer to an integrated response to the regulatory compliance (Bailey et al., 2004).

Relative to its peers in other sectors of the economy, the banking sector is generally a step ahead when it comes to corporate risk management. This is basically due to the fact that the industry is a highly regulated one which uses money from the public for its business operations. Nonetheless, a mere meeting of regulatory required risk management program is by no mean a guarantee to banks' competitiveness as business organizations amid the stiff and ever changing operating environment in the industry.

Typically, empirical examinations of corporate risk management activities would delineate the data collection between bank and non-bank sectors primarily because of the perception that the banking sector faces distinct classes of financial risk exposure inherent in the banking businesses, e.g. credit, liquidity, foreign exchange, interest rate, etc. Hence, the analysis on risk management activities in the banking sector would normally see the discussion on risk management program like assets-liabilities management (ALM) which is unique to the banks. Nonetheless, in this study of enterprise risk management implementation framework, the difference among public listed companies along the banking and non-banking sectors in the interpretation of the empirical results are not discerned. This is because the study defines enterprise risk management implementation framework in a much broader context to cover all domains of risk exposure facing firms, not just the financial risk exposure.

1.4 CORPORATE RISK MANAGEMENT AND MODERN PORTFOLIO THEORY

Modern Portfolio Theory (MPT) that originated from the publication of "Portfolio Selection" by Harry Markowitz in 1952 gives insight into the knowledge that the expected return of an asset should be positively related to its systematic risk in assets portfolio investment. Markowitz framework postulates that an asset's systematic risk is determined by the covariance of its returns with that of a well-diversified market portfolio. Asset allocation is then determined by maximizing the risk-adjusted asset return over the investment holding period. We can apply MPT argument in investment in company shares whereby ownership of a firm's shares is regarded as investment by shareholders in an asset. Hence, the expected return on a firm's shares is a function to the firm risk profile. Shareholders will demand higher risk premium or higher expected return in the shares of firms which are deemed to carry higher risk. This in turn, will increase the cost of capital for the firms.

To mitigate those firm-specific risk, portfolio theory suggests firm to diversify its business activities into several sectors of the economy so that the under-performing of one sector due to its cyclical downturn can be diversified away through business activities from other performing sectors of the economy (Zey & Swenson, 2001). Some firms will even go beyond domestic boundary to venture into overseas markets in the hope of attaining international diversification to improve corporate performance (Markides, 1994).

While portfolio theory is in favor of diversification, specialization theory argues that corporate diversification is inefficient. The specialization theory can account for diversified firms being traded at a discount compared to single-segment firms as it runs against one of the oldest ideas in economics; that specialization is productive. A popular explanation for specialization's prevalence is that firms are plagued with agency problems that allow managers to enter new businesses (from which they privately benefit) at the expense of shareholders. Other theory suggests that it is cheaper and more efficient for shareholders to diversify on their own by holding a portfolio of stocks than for corporate to diversify by entering into other area of businesses (Doherty, 2000).

The debate on the role and efficacy of risk management function in corporation is ongoing, e.g. to specialize or to diversify. However, there are a number of management theories that endeavor to rationalize the practice of risk management by firm. They include managerial self-interest, taxes, bankruptcy costs and capital market imperfections as justification for hedging risk (Crouhy et al., 2000). Nevertheless, the notion that a robust model of corporate risk management may contribute in reducing firm-specific risk in order to maximize corporate value for both proponents of portfolio theory and specialization theory has been generally accepted.

In an age of frequent spates of terrorist incident occurrences, fierce global competition, economic shocks and corporate governance challenges, business risks have never been greater. This adverse environment is compounded with an increasing number of high-profile corporate governance scandals that had resulted in corporations facing huge amount of financial losses globally. The aftermath of some had even threatened the solvency of the corporations concerned. A case in point is the recent United States financial meltdown in 2008 which was triggered by the sub-prime mortgage crisis that saw the tumbling of giant institutions like the Fannie Mae, Freddie Mac, Lehman Brothers, Merrill Lynch, and the American Insurance Group. The consequences of the crisis are far reaching. Although it started as the "sub-prime crisis" in the United States in 2007, the impacts mushroomed into a full-blown global recession in 2008 and the remnant effects of which can still be felt in 2010. These incidents have highlighted the urgent need for corporate entities to put in place a strong and effective risk management mechanism within their business models to ensure minimum loss and business continuity disruption in the event of similar incidents recurring.

Every risk has financial implications. Those risks that are not properly managed by the firm will be priced by the markets. Shareholders will ask for a discount to the firm's share price and creditors will ask for a risk premium to its debt instruments. Internally, the firm has to allocate more capital to cushion the depleting effects from potential perils which can affect the capital reserve thus ensuring operating solvency of the firms. The added burden on the cost of capital in this context has become a major concern to corporations. As such, the true cost of capital and the true cost of equity of the firm depend on the understanding of its level of risk. The proper management of risks faced by the firm can reduce external capital cost, hence enhancing capital efficiency. It is vital, therefore, to realize that one important way of reducing the firm's cost of capital and cost of equity is to take a strategic view of corporate risk management. This strategic view entails corporations to actively identify and assess the risks in the course of their operations, and then develop appropriate ways of controlling or mitigating those risks. Along with this strategic approach, corporations should advance risk management initiatives into a value-adding business function. For instance, aligning business processes with the major operational concerns of the enterprises in this way, namely by focusing on the risk management area, will be critical to ensure the enterprises' success.

The above assertion of addressing enterprise risks entails corporations to put in place a functional yet dynamic risk management model within their operating structure. Such a model can be manifested in a concept known as ***enterprise risk management*** or ***ERM***.

1.5 NEW ORIENTATION TO CORPORATE RISK MANAGEMENT

Enterprise risk management or ERM is a new orientation or paradigm to corporate risk management (CRM). The conventional CRM method involves risk management technique such as hedging activities by utilizing such risk management tools as derivative contracts, e.g. futures and options contracts. The conventional CRM programs typically aim to address specific financial risks such as *credit* (e.g. concentration, securitization, credit derivative), *market* (e.g. interest rate, currency, equity, commodity), and *liquidity* (e.g. refinancing) risks facing the firm. Often times these risk management activities are carried out in silo and in separation by various parties within the same firm to suit their individual risk management needs. For instance, apart from officials managing financial risk, chief information technology officers similarly manage the information technology infrastructure to make certain that IT risks are minimized whilst corporate lawyers or internal auditors manage legal and regulatory risks. Nevertheless, it is seldom that these officials tasked with risk management responsibilities work together to share risk oversight information. The recent global financial crisis in 2007/2008 which saw the collapse of many large global companies in the US and Europe has raised questions regarding the effectiveness of conventional risk management practices.

A new orientation to CRM entails expanding the risk management spectrum and widening its perspective to include other firm-specific or idiosyncratic risk factors which are strategic to the firm's operations as well as earnings generation. Examples of these operational risks are legal, political, reputational, volatility, settlement, profit, and systemic risks, to name a few. Other risk factors strategic to the firm can be identified through risk mapping[1] initiatives undertaken from time to time amidst the evolvement of business environment. The ultimate goal of this new orientation to CRM is to enhance and improve risk oversight.

ERM embodies this new orientation to CRM. ERM calls for not only these expanded spectrum of risks to be identified and duly managed, but also emphasizes to manage them in a holistic manner where the approach must be integrated and aligned to the firm's long-run strategic goals (e.g. not to rely solely on derivative contracts or insurance policies). Figure 1.1 depicts the comparison between the traditional approach of CRM with the new orientation to CRM which is embodied in ERM implementation.

[1] Risk mapping is a technique used to identify possible occurrence of events that will negatively affect the firm. It involves determining the possible frequency and severity of such occurrence. It helps present the identified risks and determine what actions should be taken toward those risks.

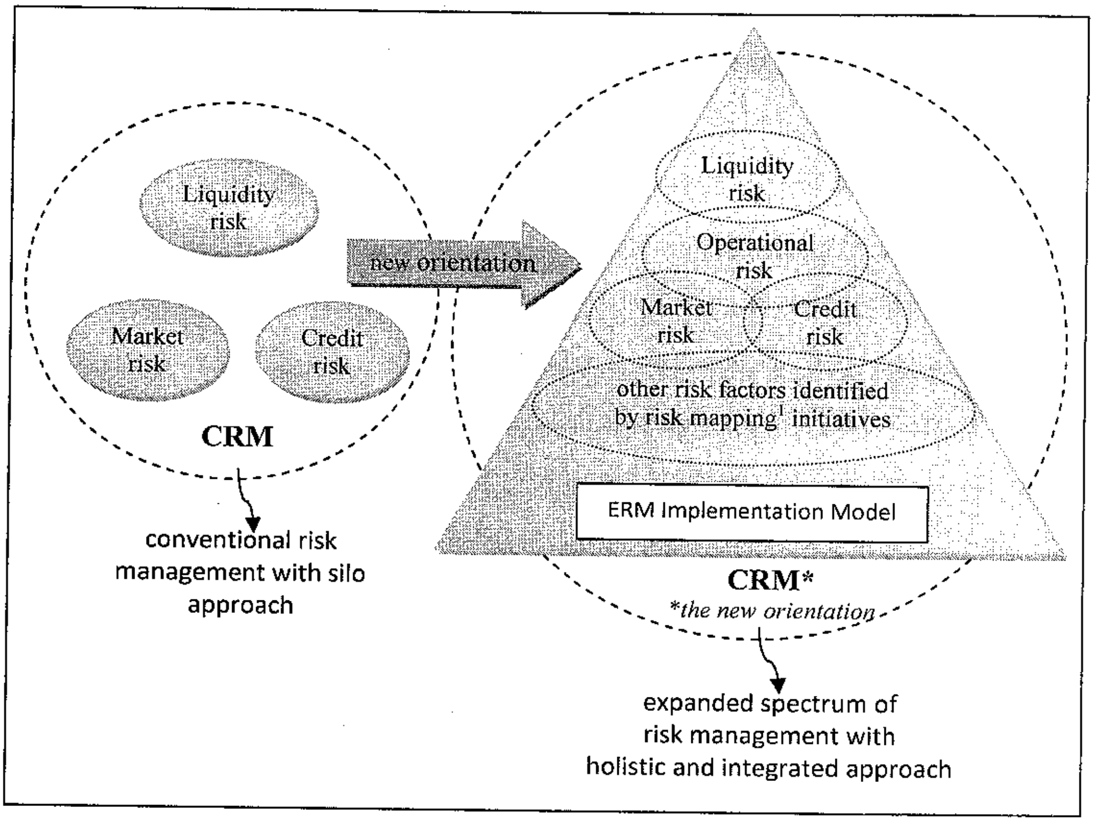

Figure 1.1: New Orientation to CRM Embodied in ERM

From the figure above, ERM can be regarded as a *model* or technique to which the new orientation of CRM is embodied in expanding the spectrum of risk management as well as in addressing additional aspects of firm-specific or strategic risks that are essential in value creation for the firms and shareholders.

The conceptual framework of ERM implementation is built upon the strategic theory of risk premium in generating value for the firm and shareholders. This value creating theory is deliberated through the strategic conceptualization of firm risk premium in managing three classes of risk facing the firm, namely the *tactical*, *strategic*, and *normative* risks identified by Chatterjee, Lutbatkin and Schulze (1999).

The Malaysian public listed companies (PLCs) are not oblivious to the new and heightened challenges facing them in today's business environment and operating landscape. Many PLCs are in fact constantly in search for new models of CRM to address these additional risks that are either inadequately or not duly addressed by the conventional CRM mechanism, e.g. through hedging activities with derivative contracts. For instance, some risks are not transferrable to counter parties by way of engaging in derivative contracts. Neither can those risks be cost effectively transferred to insurers through purchasing insurance policies. Examples are the operational risks mentioned above. By simply ignoring these risks whilst having the full knowledge of their very existence does not seem to conform to best practice of managerial accountability and fiduciary responsibility. Due to this reason, many PLCs scramble to find a solution (new orientation to CRM) in addressing such risk factors by operationalizing what they deem are the necessary processes to tackle these idiosyncratic or strategic risks facing them. However, due to the novelty in the concept as well as the lack of process standardization of ERM implementation, many PLCs may not be aware that they are actually attempting to implement ERM program let alone to ascertain if they are implementing it effectively.

Thus, this thesis endeavors to define and develop an ERM implementation model so as to gauge the ERM penetration level (implementation intensity) among the Malaysian PLCs. Based on the defined ERM implementation model, this thesis attempts to establish a conceptual framework (with theoretical and empirical support) on shareholders value maximization of ERM implementation. Specifically, **the framework theorizes positive causal relationship between ERM**

implementation intensity and some perceived ERM benefit measures manifested through the strategic conceptualization of firm risk premium identified by Chatterjee, Lutbatkin and Schulze (1999) and this shall form the core of this thesis. The strategic conceptualization of firm risk premium is referred to as the *CLS model* in is thesis and the details of which are presented in section 2.10.

In general, this thesis defines ERM model to be comprised of fourteen elements and processes. These fourteen elements and processes cover three key dimensions of the implementation framework, namely the *structure*, *process*, and *governance*. The operational definition of ERM and the fourteen elements and processes of its implementation are further discussed in sections 2.8 and 3.7 of this thesis.

1.6 ENTERPRISE RISK MANAGEMENT

Enterprise risk management (ERM) is a term which was unheard of in the corporate arena a decade ago. It is fast catching up in the corporate agenda and is swiftly gaining currency due to changing business practices and escalating regulatory requirements. Whilst the concept of ERM is widely cited today, there is no unified definition of the terminology nor is there a standardized operational framework. There remain great variations in terms of how firms define, measure and implement ERM. Nonetheless, at the broader level, there are commonalities in the way institutions define and perceive ERM. In general, ERM can be defined as a standard corporate risk management process which undertakes an integrated approach in viewing and treating all risks. ERM focuses on relating risks and aligning risk management initiatives to business objectives and to the overall corporate strategy in order to attain competitive advantages (Bailey et al., 2004). ERM is a concept of a holistic approach to corporate risk management. Its methodology ensures all risk management functions from all parts of the enterprise to be integrated, as opposed to each of them functioning in silo. ERM implementation program can be deployed to provide strategies for leveraging risk management to increase the company value. The program bridges the gap between corporate finance and risk management. Thus, corporate risk management program should render a broader, strategic view of risk management that will help the company finds value in uncertainty and avoids surprises that can blindside the business and shake up the market.

ERM advocates a holistic method to risk management that enables the firm to stabilize earnings and reduce the expected costs of external capital, thus improving the firm's capital efficiency. This in turn, will result in the enhancement of the firm's value. Bierc (2003) introduced the concept of strategy risk management (SRM), which is equivalent to the concept of ERM, to embody the above arguments. Bierc proposed that SRM to be developed and pursued so that the key drivers that determine the firm's success and value can be identified and are actively being managed upon.

While enterprise risk management and financial management are intertwined, many organizations treat them separately. This study is therefore set to investigate how public listed companies in Malaysia perceive and manage the risks that emerge in their enterprises. The study will focus on the effects of enterprise risk management on perceived cost of capital, shareholders value, and business performance of the firm. The study will also examine the challenges for effective implementation of ERM program.

1.7 ENTERPRISE RISK MANAGEMENT AND ITS RELEVANCE TO CORPORATE MALAYSIA

In the Malaysian scene, the 1997-98 Asian financial crises had exposed the inherent internal vulnerability of Corporate Malaysia in weathering external shocks. The outlook for Corporate Malaysia will even be more challenging with the expected worsening of operating environment due to intense competition brought about by globalization and market liberalization. The demanding environment will be compounded by the unpredictable market conditions and future economic performances due to the aftermath of terrorist attacks in New York and London in 2001 and 2005 respectively and the rise of commodities prices such as that of petroleum prices. In light of this scenario a study detailing the relevancy and the effectiveness of a company-wide risk management in ensuring continued positive business performance and corporate valuation would be significant. Malaysia operates in an open market economy with its total trade volume amounting to twice of its annual growth domestic product (GDP). This signifies companies operating in Malaysia are exposed and susceptible to various forms of shocks, internally or externally, in the nature of economic, political, religious, cultural, technology, natural disaster etc.

Much has been discussed about the importance of risk management program by corporations and how it can enhance business performance and add to the corporate value. However, most of the discussion revolves around managing financial risk for financial institution as well as non-finance corporations (NFCs) by ways of transacting in financial derivatives, through hedging activities. There is still very little discussion on corporate risk management beyond that of managing financial risk or systematic risk, let alone discussion on company-wide risk management program especially in the NFCs and the rationale to have, or not to have such a program. It was not until recently that the concept of *enterprise risk management* or *ERM* has emerged attempting to fill the deficiency of risk management activities, e.g. hedging, which traditionally only tackles financial risk. Such an attempt is to answer the need for a more holistic approach with enterprise-wide perspective of risk management program for corporations. Fundamental argument on ERM suggests that risk management technique should look beyond financial risk factor, e.g. interest rate, price, and liquidity risks. It should also encompass those factors that form the integral part of the business process such as strategic, operations, legal, political, reputation, governance, and etc.

1.8 THE MALAYSIAN REGULATORY FRAMEWORK

In the light of corporations facing an array of risks in their day-to-day operations, the consequences of which could potentially reduce or eliminate investment return to shareholders, Malaysian regulators, i.e. Securities Commission and Bursa Malaysia, have compelled public listed companies to quantify their transactional risk exposure in the companies' annual reports, including that of off-balance sheet activities. This is an example of Malaysian regulators safeguarding the interest of investing public through regulating accounting standards approach. However, looking from a more macro level of Malaysian regulatory framework, there is no specific piece of law that imposes the need for a rigorous corporate or enterprise risk management program to be implemented by the public listed companies (PLCs). The closest reference in the Malaysian regulatory framework demanding Malaysian PLCs to manage risk lies within the *Malaysian Code on Corporate Governance*.

The Malaysian Code on Corporate Governance (Code) was first issued in March 2000. It codifies the principles and best practices of good governance and describes optimal corporate governance structures and internal processes (MICPA, 2008). Looking from the perspective of enterprise risk management, the Code asks for public listed companies to institute a formal risk management program to mitigate their business risk. The Code also entails a mandatory reporting of PLCs' corporate risk management framework in their annual reports. Following is a summary of the key milestones of the securities commission's corporate governance reform effort and its consequences, which to a certain extent, encompasses the corporate or enterprise risk management agenda in Malaysia:

As mentioned earlier the Securities Commission (SC) in March 2000 introduced the first version of Malaysian Code on Corporate Governance (Code). The Code set out broad principles and best practices of good corporate governance for Malaysia. Among other things, companies are required by the Listing Requirements of Bursa Malaysia to include in their annual reports a narrative statement of how the companies apply the relevant principles of corporate governance to their particular circumstances. This is to ensure investors have sufficient disclosure by the listed companies for assessment of companies' performances and governance practices.

In the case of initial public offering (IPO) exercises, the SC in July 2000 amended the securities and company law aimed at harmonizing the regulatory regime for issuing listing prospectuses. As a result of this effort, companies poised for listing are required to include a section of risk factors analysis in their prospectuses that serves as a reminder to investors on how their investment in the companies' IPOs can potentially be undermined. The typical risk factors being described in the prospectuses are (i) investment risks (which include credit, interest rate, liquidity, market), (ii) risk relating to the shares (which include market history of shares being offered, shareholding structure, post-listing price movement, possible failure of share trading, underwriting risk), (iii) risk relating to the applicability and timeliness of information being furnished, (iv) business risk caused by political, economic, environmental and social development landscapes, (v) regulatory risk, (vi) branding risk, and (vii) profit forecasting risk.

This followed in January 2001 whereby Bursa Malaysia undertook a major revamp of its Listing Requirements which saw the insertion of new Chapter 15 that clearly defined the roles and responsibilities of company directors in relation to corporate governance. In February the same year, the SC issued guidance for directors of company on *Statement of Internal Control.* In July 2002, the Institute of Internal Auditors issued guidelines on internal audit function. In August 2004, the SC issued guideline on "Best Practice in Corporate Disclosure". In October 2007, the SC further revised the Code in a bid to bring Malaysia's corporate governance framework in line with global best practice. The SC's main revisions were to strengthen the roles and responsibilities of Board of Directors and Audit Committees to ensure the effective discharge of their duties. The amendments also spelt out the eligibility criteria for appointment of directors and the role of the nominating committees. On audit committee front, it touched on the composition of audit committee, its meeting frequency and the need for continuous training. In addition, the revised Code required internal audit functions in all public listed companies. It also clarified the reporting line for internal auditors (SC, 2007).

Albeit the corporate governance reform efforts undertaken by the SC since the year 2000 to date, the fact remains that the requirement for PLCs to institute a formal corporate/enterprise risk management framework to manage their business risks has been modestly set within the corporate governance best practices regime. In other words, the corporate risk management requirement does not come from a specific piece of law whose rigor is comparable to that of the United States or the Japanese Sarbanes-Oxley Act (SOX). Nor is it comparable to the Australian and New Zealand risk management standards (i.e. AS/NZS 4360:2004).

For instance, the Malaysian Code of Corporate Governance (Code) describes six principal responsibilities of the Board. Out of the six principal responsibilities, one is directly linked to corporate risk management requirement, namely "identifying principal risks and implement appropriate systems to manage risk". The other five principal responsibilities are (1) "reviewing and adopting a strategic plan for the company", (2) "overseeing the conduct of the company's business to evaluate whether the business is being properly managed", (3) "succession planning, including appointing, training, fixing the compensation of and where appropriate, replacing senior management", (4) "developing and implementing an investor relation program or shareholder communications policy for the company", and (5) "reviewing the adequacy and the integrity of the company's internal control systems and management information systems, including system for compliance with applicable laws, regulations, rules, directives and guidelines" (SC, 2007).

At first glance, the last mentioned principal responsibility above (i.e. reviewing the adequacy and the integrity of the company's internal control systems and management information systems....) seems to be also linked to enterprise risk management. Nonetheless, internal control system relates more towards internal auditing exercise which is to ensure that enterprise's business transactions that have taken place comply with the stipulated standard operating procedures or SOP. On the other hand, corporate or enterprise risk management in its stricter sense entails a more forward looking perspectives in managing risk where its initiatives are deemed to be more preemptive in nature. The fact that corporate risk management requirement in Malaysia does not come from a dedicated law which ideally would codify clearly its principles, framework, methods and processes has resulted in it not being able to render a severe legal consequences for non-compliance of its implementation by the PLCs. Hence, it gives rise to the issue of penetration level and effectiveness of corporate/enterprise risk management practices among the PLCs.

This regulatory scenario is in stark contrast to that of under the law of SOX. In the United States for instance, public listed company officials such as CEOs, financial controllers, and external auditors are required to sign-off under oath confirming the accuracy and validity of information provided in the financial statements issued to the public. The law also asks for confirmation on the effectiveness of internal control system and risk management processes that are being implemented by the enterprises. Failing which, harsh punishment including imprisonment awaits those company officials. Such is the severity of the consequence of breaching the SOX law that corporate risk management has become a crucial and integral part and the preoccupation of the day-to-day managerial function among Corporate America's top executives.

1.9 THE DRIVING FORCES BEHIND ERM

Both external and internal factors within which the firms operate have influenced the adoption of the ERM program. The major external influences demanding the firms to a more holistic approach of risk management include (i) globalization, (ii) industry consolidation, (iii) deregulation, (iv) increased regulatory attention to corporate governance, (v) technological progress that enables better risk quantification and analysis. On the other hand, the internal factors are centered on an emphasis to maximize shareholder wealth (Liebenberg and Hoyt, 2003).

In summary, ERM has captured the attention of risk management professionals and academics worldwide. Unlike the traditional "silo-based" approach to corporate risk management, ERM enables firms to benefit from an integrated approach in managing risk that shifts the focus of risk management function from primarily defensive to increasingly offensive and strategic. Findings of a study by Liebenberg and Hoyt (2003) suggested that more highly leveraged firms are more likely to appoint a chief risk officer (CRO) than other firms of a similar size that operate in the same industry to handle organization's risk exposure. For a firm to have a robust and effective ERM capability indeed is to possess an invaluable intangible asset in its stable of resources for its productive capitalization. In the era where global economic paradigm has shifted from one that values tangible assets to one that increasingly favors intangible assets (Starbiz, 2008b), Corporate Malaysia like their counterparts in the developed economies, can rely more on intangible assets, such as that of ERM capability, to generate economic value for themselves.

1.10 PROBLEM STATEMENT

The scenario of corporate risk management of Malaysian public listed companies and its regulatory implication presents a backdrop of stark contrast to the essence of enterprise risk management between Corporate Malaysia and Corporate America. Whilst ERM is still relatively new to Corporate America, it will be just as novel to the Malaysian corporate constituents. This is especially so when it comes to ERM philosophy, concept, objectives, and the manner for its implementation.

Hence, there is a big question mark enveloping the curiosity that whether or not the Malaysian public listed companies can effectively implement or are able to fully internalize the ERM. Even if the public listed companies themselves are doubtful of the extent to which the implementation of ERM can add value to the firms, they may still have to institute some initiatives of ERM program to, at the very least, meet the regulatory compliance requirement. Albeit so, the Malaysian public listed companies at present can still afford time and room to improve their learning curve for the effective implementation of ERM as the regulatory and stakeholders expectations of it are relatively not as high as those seen in the United States and elsewhere with more advanced and matured market condition. However, it is foreseeable that sooner rather than later, we can expect the Malaysian regulators, i.e. the Securities Commission and the Bursa Malaysia, as well as other stakeholders, i.e. shareholders, creditors, rating agencies, to step up their demand and expectation for the standard and intensity of an effective organizational risk management via ERM implementation. Needless to say, to entice Corporate Malaysia to wholeheartedly put in place a robust yet dynamic ERM program, they have to be convinced that such effort and investment, in meeting regulatory compliance apart, will bring about true value adding effect to their firms.

The challenge to ERM implementation is compounded by the fact that despite risk management is an essential part of prudent business management, its justification is at times difficult to come by. This is because the benefits which ERM generates may not be explicit or tangible in the short run. On the other hand, the costs associated with its implementation are often too visible.

Nonetheless, there was hardly any well researched framework and model on the subject matter in the Malaysian setting from which Corporate Malaysia can make reference. It will be of great interest to find out, therefore, if most of the practices of corporate risk management by listed companies in Malaysia are driven merely for the sake of regulatory compliance or if they really bring about tangible and significant benefit to companies through the effective implementation of them. It is also important to find out the direction and strength of relationships, among the numerous factors intertwining in the concept of ERM modeling which is underpinned by theories from portfolio management, risk management, information economics, and strategy. Since there are limited empirical studies related to this area, much less in the Malaysian context, the efficacy of corporate risk management via ERM among Malaysian listed companies warrant examination.

1.11 THE AIM AND OBJECTIVES

The aim of this study is fourfold. First, it attempts to examine the depth of penetration of ERM practices among the public listed companies in Malaysia. This is done through the measurement of a metric that gauges the ERM implementation intensity of the public listed companies.

Second, it proposes an enterprise risk management (ERM) implementation framework. From the proposed ERM framework, it examines how an effective implementation process of ERM, i.e. implementation intensity, will bring about value-enhancing outcome, i.e. perceived ERM benefit measures, to the Malaysian corporations. Besides, this thesis also examines how the challenges during the ERM implementation process affect such implementation intensity and perceived ERM benefit measures. Hence, this study attempts to create a perceptual causal relationship model relating these variables. In the process, the study has (i) developed a *conceptual framework* of risk premium in relation to support a practical framework for Enterprise Risk Management (ERM), and (ii) developed a predictive model (*practical framework*) to anticipate value-adding ERM successes in corporate Malaysia.

Third, this study analyzes the primary reasons for firms engaging in enterprise risk management despite the lucid argument from the neo-classical finance theory that such risk management program, especially risk management for firms' unsystematic risk, is futile. In this light, this study scrutinizes several risk management value maximization theories and their corresponding hypotheses to justify for ERM's implementation. The most cited hypotheses in literature justifying corporate risk management activities such as that of ERM are in the areas of profit maximization, financial distress cost, lowering tax burden, costly external financing, credit rating, equity market reward, informational asymmetries, and agency cost.

Fourth, this study investigates the validity of a conceptual transmission mechanism for shareholders value creation of the proposed ERM framework. This conceptual value creation transmission mechanism is via a strategic risk premium model. The cited strategic risk premium model categorizes three classes of unsystematic risk to which firms can manage in order to create value for shareholders. These three classes of unsystematic risk are tactical risk, strategic risk, and normative risk.

Therefore, the specific objectives in which this study aims to achieve are as follows:

1. to examine the depth of penetration of ERM practices among the Malaysian public listed companies
2. to investigate the causal relationship between the factors of *ERM implementation intensity* and the factors of *perceived ERM benefit measures* in the proposed ERM framework
3. to investigate the causal relationship between the factors of *ERM implementation challenge* and the factors of *ERM implementation intensity* in the proposed ERM framework
4. to scrutinize the significance of the proposed ERM implementation framework vis-a-vis the cost of financial distress hypothesis
5. to scrutinize the significance of the proposed ERM implementation framework vis-a-vis the tax burden hypothesis
6. to scrutinize the significance of the proposed ERM implementation framework vis-a-vis the costly external financing hypothesis
7. to scrutinize the significance of the proposed ERM implementation framework vis-a-vis the credit rating hypothesis
8. to scrutinize the significance of the proposed ERM implementation framework vis-a-vis the equity market reward hypothesis
9. to scrutinize the significance of the proposed ERM implementation framework vis-a-vis the informational asymmetries hypothesis
10. to scrutinize the significance of the proposed ERM implementation framework vis-a-vis the agency problem hypothesis

11. to examine the significance of the proposed ERM implementation framework in relation to reducing the firm's tactical risk
12. to examine the significance of the proposed ERM implementation framework in relation to reducing the firm's strategic risk
13. to examine the significance of the proposed ERM implementation framework in relation to reducing the firm's normative risk

1.12 BRIEF STATEMENT OF HYPOTHESES

In developing an ERM implementation model, a series of hypotheses have been tested by the author concerning the relationship between the implementation intensity, perceived ERM benefit measures, and the implementation challenge. In particular it is investigated as whether there is a positive causal relationship between implementation intensity and perceived ERM benefit measures, and whether there is a negative causal relationship between implementation challenge and implementation intensity.

From the results of these tests, a generalization of successful ERM implementation regarding perceived ERM benefit measures and a generalization of ERM implementation challenges toward ERM implementation intensity among corporate Malaysia are determined. Details of the results follow in Chapter 4. Figure 1.2 depicts, in a simple form, what the practical framework will look like. The direction of the causal relationships, indicated by the arrows in Figure 1.2, shows that ERM implementation intensity will affect perceived ERM benefit measures whilst implementation challenge will affect implementation intensity. The hypothesized directions of these arrows are determined based on conceptual frameworks of Cummins et al.(1998), Smith and Stulz (1985), Markides (1994), Liebenberg and Hoyt (2003), Chapman (2003), Meagher and O'Neil (2000), Stoke (2004), Bierc (2003), Crouhy et al.(2006), Bailey et al. (2004), Belmont (2004), Lam (2003), Bettis (1983).

The detailed discussion of the hypotheses development is presented in chapter 3, section 3.3.

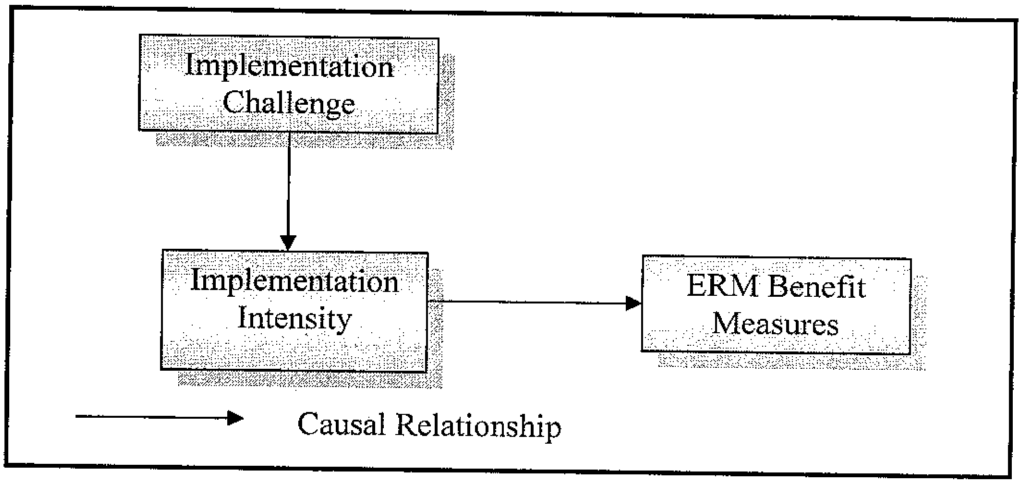

Figure 1.2: An outline of the path diagram of the practical framework

1.13 THE SCOPE OF THE THESIS

The scope of this thesis involves the discussion of three frameworks, i.e. the *theoretical*, *conceptual*, and *practical* framework. The *theoretical framework* presents the theoretical foundations underpinning the underlying *conceptual* and *practical* frameworks. Whereas the *conceptual framework* features a value-creating ERM framework via a strategic risk premium model. The strategic risk premium model underscores positive risk premium (cost of capital) impacts from managing firm-specific (unsystematic) risks.

The discussion involves the rebuttal of the conventional notions of capital asset pricing model relating to managing firm-specific risks. The core of the empirical testing of this thesis is built on the practical framework, i.e. the development of the perceptual causal relationship model in determining the effects of successful ERM implementation among the PLCs, as well as the validation of value maximization hypotheses of ERM practices and the value creation transmission mechanism of ERM implementation via a strategic conceptualization of risk premium model. For instance, the *practical framework* provides empirical testing of the significance of causal relationships among the dimensions of three constructs in the proposed ERM framework: *ERM implementation challenge*, *ERM implementation intensity*, and *perceived ERM benefit measures*. The practical framework forms part of the conceptual framework.

In the light of these discussions, this thesis should help to improve enterprise risk management practices by the firms.

1.14 SIGNIFICANCE OF STUDY

Previous research works on corporate risk management were mainly concentrated on financial risk management and corporate performance such as Markides (1994), Zey & Swenson (2001). Other studies looked at management theories to justify and rationalize the practice of risk management by the firm (Crouhy et al, 2000). The Portfolio Theory advocates the importance of diversification to obtain to the best risk-reward tradeoff. The Capital Asset Pricing Theory (CAPM) on the other hand, offers a model to price risk based on the covariance of portfolio risk and the market risk. Firm-specific risk is irrelevant in determining risk premium in CAPM equation. The assumptions in CAPM actually nullify the value of corporate risk management in reducing firm-specific risk. The CAPM theorizes that all firm-specific activities are unsystematic and, hence, not correlated with risk premium (Chatterjee et. al., 1999).

However, there are very few empirical studies on an enterprise-wide practice of risk management framework, particularly one with the emphasis over and above that of financial risk management, and its impact of corporate performance. ERM is one such enterprise-wide risk management framework. The lack of studies in this area is probably due to the fact that ERM framework entails managers to engage in initiatives which are seen to reduce firm-specific risks. As mentioned before, most finance theories such as that of CAPM posit that all firm-specific activities are irrelevant in influencing a firm's risk premium. Strategic theories, however, give due recognition to such initiatives in supporting corporate performance and value. In addition, there is also no in-depth research that studies the critical success factors on the effective implementation of enterprise-wide risk management program, especially in the Malaysian context.

This study will contribute to the body of knowledge by filling the gap to CAPM's challenge to the field of corporate risk management by examining empirically a practical framework of ERM which forms the building block for a value-enhancing strategic model of risk premium (see Figure 3.5). The other contribution of this study is the development of a predictive model in anticipating ERM successes in Corporate Malaysia built through examining the relevant factors of ERM implementation intensity, ERM implementation challenge, and perceived

ERM benefit measures. Several statistical procedures have been employed for the analytic model, chief of which are factor analysis and structural equation modeling.

The discussion and interpretation of the theoretical, conceptual, and practical frameworks link the strategic theory, theory of risk management, modern portfolio theory, diversification and specialization theory, theory of cost of capital, theory of performance measurement, theory of corporate valuation, in making a conclusion and generalization on the role, efficacy and the effectiveness of Enterprise Risk Management for Malaysian public listed companies.

1.15 CONTRIBUTION OF STUDY

The results of this study will benefit corporate Malaysia in that it will validate and vindicate the role of enterprise risk management in reducing firm-specific risk profile, hence, improves corporate valuation through the reduction of the firms' cost of capital (risk premium). As our markets are imperfect with limited and costly resources, it is imperative for individuals who manage the firms to have insights into factors of firm-environment interface which are able to reduce firms' cost of capital. Firms that investors perceive as being risky incur higher costs when raising capital. Higher capital costs can put a firm at a competitive disadvantage vis-à-vis its rivals who have access to lower capital costs (Chatterjee et al., 1999).

In addition, firms will be able to improve their relation with regulators and shareholders by presenting a comprehensive ERM framework. Informational friction between the management and stakeholders/investors due to asymmetric information on how the management handles corporate risk can be minimized. This will result in the reduction of the cost of doing business, especially during the time of financial distress (Froot et al, 1993).

At the operational level, the analytic model developed in the study may lend reference to Malaysian firms for adaptation of their own internal risk management modeling. Having a good risk management framework and analytic model will permit Malaysian firms to effectively allocate regulatory or economic capital necessary to cover their given level of risk exposures. It will also help firms to incorporate the cost of risk into their product pricing. Besides, it will enable firms to adopt a risk-adjusted based of performance measurement.

1.16 CHAPTERS ORGANIZATION

This thesis is organized into five chapters. The topics for each chapter are as follows: Chapter 1 – *Introduction*, Chapter 2 – *Literature Review*, Chapter 3 – *Research Design and Methodology*, Chapter 4 – *Finding and Analysis*, and Chapter 5 – *Discussion and Conclusion.*

As has been presented thus far, **Chapter 1** provides the backdrop of the core topic of discussion in this thesis, i.e. *enterprise risk management*. The chapter begins with the introduction to the history of corporate risk management. Reference is made to the risk management practices in the banking sector; the pioneer among the many business sectors in the modern corporate history in formalizing risk management system within its management structure. Discussion on the corporate risk management is then led to preliminary reference to the modern portfolio theory. The subject of corporate risk management then evolves into the concept of enterprise risk management (ERM), a relatively new managerial concept being introduced to the corporate and academic worlds in recent time. The concept of ERM and its relevance to the Malaysian corporate scene are then defined. This includes the discussion of ERM vis-à-vis the Malaysian regulatory framework that calls for its implementation. The driving forces which contribute to the thriving of ERM's acceptance and popularity are discussed. The chapter then moves to present the problem statement of this study. Discussion follows suit with the presentation of this study's aim and objectives, brief statement of hypotheses, and the scope, significant, and contribution of this study.

Chapter 2 presents the review of relevant literature pertinent to the topic and core subject of this study. The topics laid out in this chapter can be broadly demarcated into three parts. The first part covers the areas of the history and meaning of risk as well as the definition of risk management. The second part relates to the operationalization of enterprise risk management (ERM). The third part features ERM's value creation transmission mechanism. The literatures reviewed are organized and presented in the following topics: (1) risk introductory, (2) evolution of risk management, (3) concepts of risk management, (4) empirical research in enterprise risk management, (5) theoretical arguments for corporate risk management, (6) value propositions of corporate risk management, (7) managing risk individually vis-à-vis the integrated approach, (8) the operational definition of ERM, (9) the theoretical foundations of ERM, (10) a strategic conceptualization of risk premium. Discussion of the literature review in Chapter 2 provides the foundations for the development of the *theoretical*, *conceptual* and *practical* frameworks. The core of the literature discussion for the *theoretical* framework provides the rebuttal of the neo-classical finance theory notion in relation to managing firm's unsystematic risk. Whereas that for the *conceptual* framework expounds the strategic conceptualization of risk premium model which espouses the value creation transmission mechanism of ERM whilst the literature review for the *practical* framework provides the building blocks for defining the pertinent dimensions of the proposed ERM implementation model. The incorporation of the theoretical, conceptual, and practical frameworks characterizes this study's *overall ERM framework.* Figure 1.3 portrays the essence of which the presentation of literature review in chapter 2 embodies, i.e. the underpinning of the overall ERM framework.

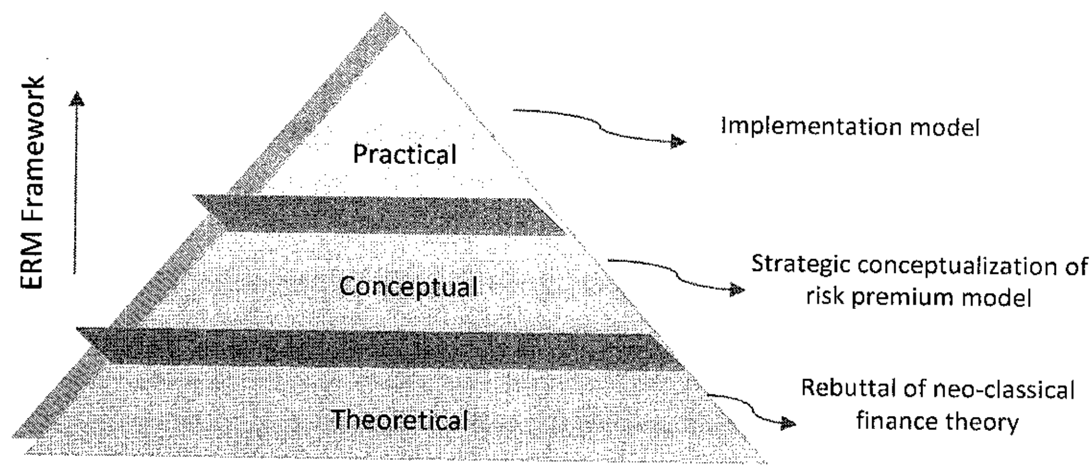

Figure 1.3: Literature Underpinning the Overall ERM Framework

Chapter 3 presents the research design and methodology of the study. It highlights the **conceptual** and **practical** frameworks of the theorized ERM proposition of the thesis. The *conceptual* framework presents the overall theorized proposition of a shareholder's value creating ERM model whose theoretical underpinning is derived from the discussion of literature review in Chapter 2. This thesis refers to the theoretical underpinning as the **theoretical** framework for the study. The *conceptual framework* is embodied by three sections, i.e. (i) an ERM *practical framework*, (ii) a strategic conceptualization of risk premium model, and (iii) ERM value maximization hypotheses for business performance. All these three sections are connected to engender value for shareholders through reducing firms' cost of capital (risk premium) and attaining some measures of business performance. Figure 1.4 depicts these relationships.

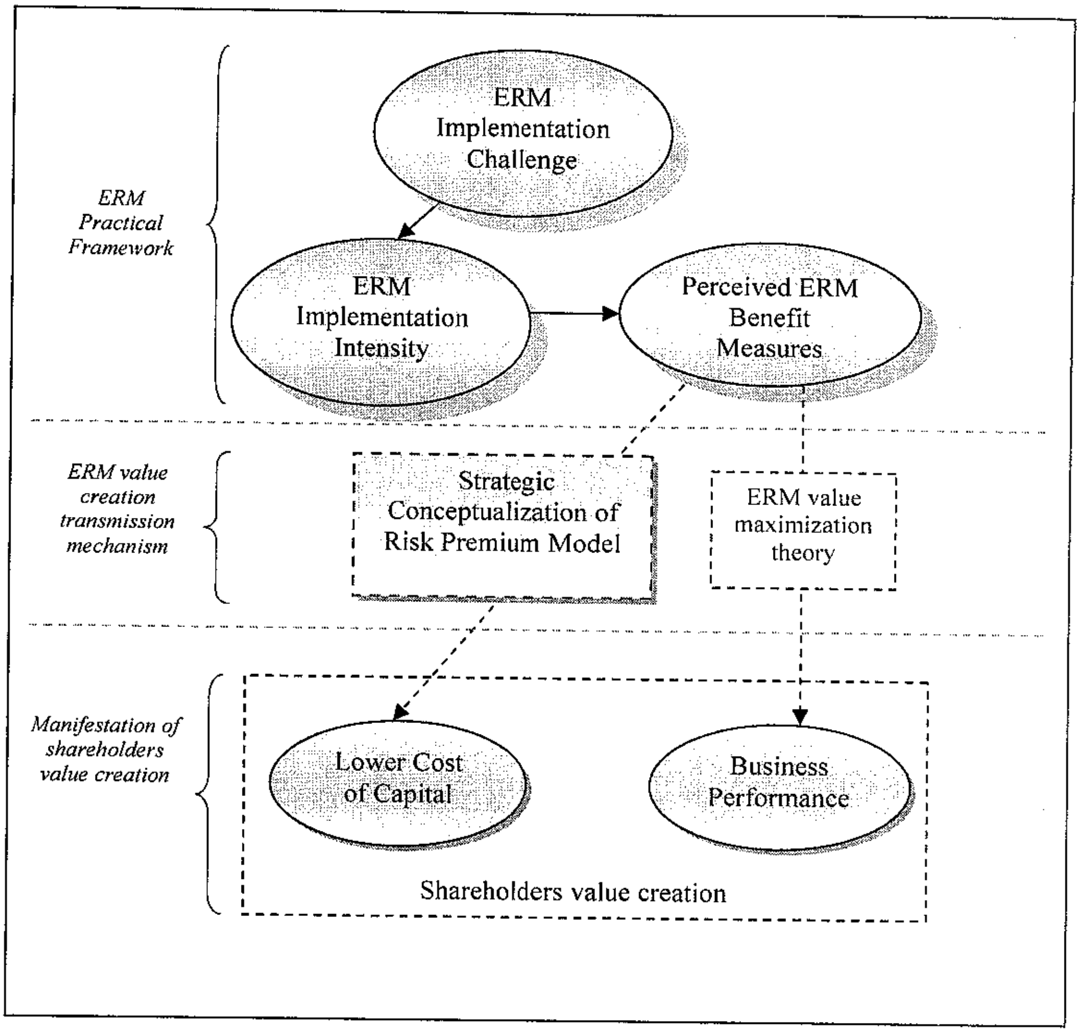

Figure 1.4: The Conceptual Framework of the Study

The *practical framework* on the other hand, is a subset of the overall conceptual framework. It illustrates the study's proposed ERM implementation model which encompasses the theorized causal relationships among the pertinent constructs, i.e. implementation intensity, implementation challenge, and perceived benefit measures, as well as the constructs' respective factors.

The posited conceptualization of firms' risk premium model serves as a value creation transmission mechanism for ERM implementation toward the reduction of firms' risk premium and cost of capital, to which they lead to value creation for shareholders.

The ERM value maximization theory make inference to the hypotheses of minimizing the cost of financial distress, reducing tax burden, avoiding costly external financing, agency problem, and informational asymmetries theories of corporate risk management, to name a few, to deliver enhanced business performance for the firms.

The chapter proceeds with the discussion on the development of various hypotheses for empirical testing. Three groups of hypotheses are developed for the testing of their validity. Each for the three sections embodying the *conceptual framework* mentioned earlier. For instance, the first group of hypotheses is to test on the significance of causal relationships among constructs and factors in the *practical framework*, the second group of hypotheses are to validate the value creation transmission mechanism of the conceptualization of the strategic risk premium model for ERM implementation, and the third group of hypotheses are to test on the ERM value maximization theory.

The chapter also presents the study's research design, the target population, sampling frame, sampling size, and sampling method for data collection through questionnaire survey to the public listed companies (PLCs) on the Malaysian stock market - the Bursa Malaysia. Constructs measurement and variables scale are discussed in the chapter.

The last section of Chapter 3 is dedicated to the study's analytic models. There are two primary analytic models, namely structural equation modeling (SEM) and bivariate Pearson correlation analysis. Factor analysis is also performed serving as the foundation in building up the proposed structural equation modeling for a value creating ERM implementation framework. Specifically, SEM analysis is employed to test on the hypothesized causal relationships among constructs and factors in the *practical framework*, i.e. the ERM implementation model. The bivarate correlation tests are performed to test on the associative significance between ERM implementation (independent variable) and the various items (dependent variables) embodying the strategic conceptualization of firms' risk premium (ERM value creating transmission mechanism) and the ERM value maximization theory for business performance in testing for their validity. The SEM and bivariate correlation analyses together close the analytic loop for examining the validity of the overall conceptual framework of the shareholders value creating ERM proposition of this thesis.

Chapter 4 presents the analysis and findings of the study. It first provides the background of the survey exercise, its execution method, the population under study, the targeted respondents, the questionnaire design, and the sampling method. The chapter then discusses the frequency distribution analysis of the various statements in the questionnaire relating to the ERM penetration level among the public listed companies. This is followed by discussion on the results and findings of reliability analysis, exploratory factor analysis, confirmatory analysis, bivariate Pearson product moment correlation test and structural equation modeling analysis. All the results are then related to the examination of the various hypotheses that have been developed. Examination of the various hypotheses is organized into three sections, namely (i) the hypotheses on the causal relationship among constructs and factors of the ERM practical framework through SEM analysis, (ii) the hypotheses on the ERM value maximization of business performances through bivariate Pearson product moment correlation test, and (iii) the hypotheses on ERM value creation transmission mechanism of the strategic risk premium model through bivariate Pearson product moment correlation test. Figure 1.5 depicts a graphical representation of the study's hypotheses examination and the analytic model.

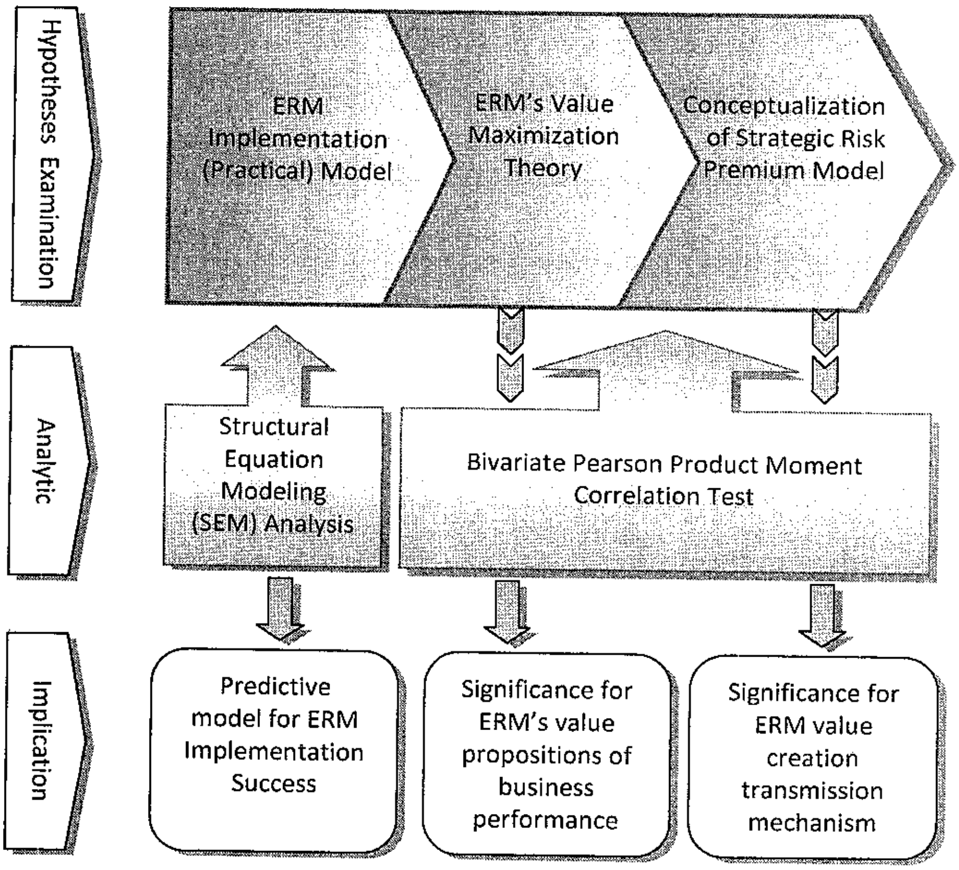

Figure 1.5: The Hypotheses Examination and Analytic Model

Chapter 5 represents the final chapter for the thesis. It presents the *discussion* and *conclusion* of the thesis to provide an overall yet meaningful perspective by connecting all the discussions that are being presented from chapter 1 to chapter 4. Specifically, this chapter interprets in a holistic manner of the findings relates to the **conceptual** and **practical** frameworks of this study. Discussion is also presented for the outcome of the factor model and the endogenous constructs in the structural equation modeling analysis. It then follows with the discussion on the significance of the dynamic (strategic) framework of the firms' risk premium, i.e. the theorized ERM value creation transmission mechanism via managing firm-specific risk. The *implications* of the various findings are discussed. The *limitations* of the research vis-à-vis the interpretation of the findings are clearly stated. This provides caveat to any further inference of the analysis findings to be made. A *conclusion* to all the salient points of the results and findings of this study is also presented. Finally, before the chapter closes, it takes stock of the status of achievement of the many research objectives that have been set out to accomplish at the onset of this thesis.

CHAPTER 2 LITERATURE REVIEW

2.1 INRODUCTION: RISK

2.1.1 Risk and Human History

Risk, and its management, has long existed in human history albeit at its most primary and purest form. Its aim is to ensure the very survival of mankind through the trying time of facing all problems for living. As mentioned by Vaughan (1997, p.2), "the entire history of human species is a chronology of exposure to misfortune and adversity and of efforts to deal with these risks". Vaughan (1997, p.2) professed that the continued existence of human being as a species, indeed, is "testimony to the success of our ancestors in managing risk". The major risks faced by primitive man in the early days of human history were those related to extreme weather, hunger, ferocious beasts, all of which made up hazardous living environment. Similar to other animals, these primitive man's initial responses to these risks were ones that went without involving any cognitive process; merely through instinctive reaction such as fleeing the scene when confronted with vicious wild animals. Throughout the time, however, with the ability to learn, they would avoid dangerous areas and situations (Vaughan, 1997).

Nonetheless, Vaughan (1997) cast doubt that the instinctive reaction and learned behavior are sufficient explanation of why our ancestors succeeded in managing the risks they faced. Vaughan (1997) reasoned that other humanlike creatures, such as *Homo erectus* and *Homo Sapiens nean-derthalensis*, which were physically larger and stronger, did not succeed in their risk management for survival despite employing the same responses in facing those risks. Vaughan opined that modern humans (*Homo Sapiens Sapiens*) "survived and flourished" because "men and women think, and it is in their ability to think that they deal with risks in ways that are different from those of other creatures" (1997, p.2). The thinking nature of human being in facing and dealing with risk has enabled them to anticipate adversity and to prepare for it (Vaughan, 1997).

Kloman (2003) could not agree more that life is full of uncertainties and that events of human history are a string of endeavors to understand unexpected events. Kloman took religious and spiritual perspectives in explaining how man deals with overwhelmed uncertainty in life. According to him, man would attribute natural disaster such as floods, storms, lightning bolts and social affairs such as success in battle and love to gods or fate. As such, in order to hinder disaster from befalling upon them or to triumph in social activities, men and women prayed to gods. In many instances men and women would also make offerings and even human sacrifices to propitiate the divine spirits (Kloman, 2003).

Relationship between human nature and characteristics with that of risk and uncertainty in life which underscore the drive for risk management is well spelt out in the 1966 study of saints, sinners, madmen and gurus, *Feet of Clay*, by Anthony Storr. In the study, Storr described doubt and uncertainty as "distressing conditions from which men and women passionately desire release… As a species, we are intolerant of chaos and have a strong predilection for finding and inventing order…Certainty is hugely seductive" (Storr quoted by Kloman, 2003). Nevertheless, the existence of uncertainty in life is not necessarily a negative or counter-productive phenomenon. The Nobel laureate physicist Richard Feynman held a contrarian view from Storr which linked uncertainty and risk taking to the progression of human civilization and development. Feynman noted that "it is in the admission of ignorance and the admission of uncertainty that there is hope for the continuous motion of human beings in some direction that does not get confined, permanently blocked, as it has so many times before in various periods in the history of man" (Kloman, 2003). With the ability to learn, man studied their encounters with uncertainty of events that had happened such as natural disaster and realized that some events occur within a pattern (Kloman, 2003). Soon, they took up the challenge to confront uncertainty and to determine the causes of various misfortunes. And as Kloman put it, "they began to create measurable risk from immeasurable uncertainty."

Another literature that serves as, perhaps, the best chronicle of human progress to treating uncertainty as "risk" rather than attributing it to gods' act is Peter Bernstein's *Against the Gods: The Remarkable Story of Risk* (Kloman, 2003). Bernstein wrote: "The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk: the notion that future is more than a whim of the gods and that men and women are not passive before nature. Until human beings discovered a way across that boundary, the future was a mirror of the past or a murky domain of oracles and soothsayers who held a monopoly over knowledge of anticipated events" (Bernstein quoted by Kloman, 2003). Man, according to Kloman (2003), treated uncertainty as risk through the application of experience, numbers and probability. This manner of how men and women dealt with uncertainty is, as Vaughan (1997) pointed out, one of the very defining characteristics of humanity.

20th century saw the most progress being made in understanding of risk and the comprehension of its measurement through academic discourse and socio-economic policy formulation. According to Kloman (2003), the key milestones of the progress could be related to the following:

'Otto von Bismarck introduced social security and workers' compensation in Germany in the late 1800s, from which these ideas spread to Europe and the United States in the early 1900s'.

'Frank Knight's ***Risk, Uncertainty & Profit*** *(1921) celebrated the prevalence of surprise and separated risk from uncertainty. He cautioned against over-reliance on extrapolating the past into the future'.*

'John Maynard Keynes' ***Treatise on Probability*** *(1921) cited the importance of perception and introduced us to the Law of Great Numbers'.*

'Von Neumann and Morgenstern (1926 and 1953) created the theory of games and strategy and suggested that the goal of not losing is often superior to that of winning'.

'Markowitz (1952) developed portfolio analysis, including new aspects of return and variances'.

2.1.2 Defining Risk

According to Holton (2004), there are limited definitions of risk provided by financial literature albeit the discussions of risk are aplenty. Like Kloman (2003), Holton (2004) pointed out that one has to explore two streams that flew through the 20th century in the quest to understand risk, namely subjective probability and operationalism. Both streams, according to Holton (2004), were originated from the same source in the empiricism of David Hume (1784).

Hume (1784) provided the philosophical roots of subjective interpretations of probability with the following account:

> *"Though there be no such thing as Chance in the world; our ignorance of the real cause of any event has the same influence on the understanding, and begets a like species of belief or opinion (p.55)".*

Among the revolutionary reports of subjective probability include those of Frank Ramsey (1931), Bruno de Finetti (1937), and Leonard Savage (1954).

The most famous definition of risk came from Frank Knight (1921). Knight (1921) provided an objectivist perspective during a period of active research into foundations of probability. The debate during this period relates to subjective versus objective interpretations of probability (Holton, 2004). The difference between the objectivist views and the subjective interpretations of probability is that the former asserts that probabilities may be discovered through statistical analyses, hence they are real. The contemporaneous research relating to the objectivist views of probabilities includes John Maynard Keyenes (1921), Richard von Mises (1928), and Andrey Kolmogorov (1933) (Holton, 2004). On the other hand, the subjective interpreters view probabilities as human beliefs as they are being specified in accordance to individuals' own characterization of uncertainty. As such, probabilities are not intrinsic to nature as in the view of these subjectivists (Holton, 2004).

Putting the objectivist view of probabilities into perspective, Knight (1921) for instance, opined that "propositions have intrinsic probabilities of being true or false" (Knight quoted by Holton, 2004, p.19). Knight illustrated two different manners from which probabilities are derived as follows: (i) *a priori* probabilities which are obtained from inherent symmetries, as in the throw of a die, and (ii) statistical probabilities that are derived through analysis of homogenous data (Knight quoted by Holton, 2004). According to Holton (2004), Knight was critical on the subjective interpretation of probability (through opinions formed) without the presence of symmetry or homogenous data. Knight (1921) asserted that *a priori* and statistic probabilities embody "measurable uncertainty" and opinions denote "unmeasurable uncertainty". Knight (1921) then came up with the following terminology in place for the terms "objective probability" and "subjective probability" (Knight quoted by Holton, 2004, p.20):

> *"To preserve the distinction ... between the measurable uncertainty and an unmeasurable one we may use the term 'risk' to designate the former and the term 'uncertainty' for the latter" (p.233).*

Therein lies the famous definition of "risk" by Knight where the term "risk" relates to objective probabilities whilst the term "uncertainty" concerns with subjective probabilities. It was this distinction from Knight in regard to risk and uncertainty that it had effectively made for the economic importance of these concepts. Further more, Knight (1921) had also linked profits, entrepreneurship and the very existence of the free enterprise system to risk and uncertainty. As a result of Knight's treatise, economists like John Hicks (1931), John Maynard Keynes (1936, 1937), Michal Kalecki (1937), Helen Makower and Jacob Marschak (1938), George J. Stigler (1939), Gerhard Tintner (1941a, 1941b), A.G. Hart (1942) and Oskar Lange (1944), started to take risk or uncertainty into account to discuss subjects like profits, investment decisions, demand for liquid assets, the financing, size and structure of firms, production flexibility, inventory holdings, etc. (SCEPA, 2010).

However, there is a weakness in Knight's definition of risk. Knight's definition of risk only touches on probability and uncertainty but left out the element of exposure, or the possible consequences of facing such an uncertainty. This is a contentious area of Knight's definition of risk among his critics (Holton, 2004).

Essentially, Frank Knight (1921) had established a very clear distinction between the meaning of risk and uncertainty in his seminal work *Risk, Uncertainty, and Profit* when he wrote:

> *"...Uncertainty must be taken in a sense radically distinct from the familiar notion of Risk, from which it has never been properly separated. The term 'risk', as loosely used in everyday speech and in economic discussion, really covers two things which, functionally*

at least, in their causal relations to the phenomena of economic organization, are categorically different. ... The essential fact is that 'risk' means in some cases a quantity susceptible of measurement, while at other times it is something distinctly not of this character; and there are far-reaching and crucial differences in the bearings of the phenomenon depending on which of the two is really present and operating. ... It will appear that a measurable uncertainty, or 'risk' proper, as we shall use the term, is so far different from an unmeasurable one that it is not in effect an uncertainty at all. We ... accordingly restrict the term 'uncertainty' to cases of the non-quantitive type" (p.19).

2.1.3 Operational Definitions of Risk: The Nature and Meaning of Risk

Holton (2004) provided a further definition about risk in an apparent attempt to address the shortcoming of Knight's (1921) definition of risk. Holton asserted that risk entails two essential components, namely (i) exposure, and (ii) uncertainty. He defined *exposure* as if someone cares about certain outcome of an event and that the person is 'exposed' if she has a personal interest in what transpires. Apart from that, Holton (2004) defined *uncertainty* as a situation where people do not know what will happen to a particular event, e.g. venturing into a new business or asking for someone's hand in a marriage. In other words, the outcome of that particular event is uncertain. Hence, risk is present in an event or situation which manifests these two elements of *exposure* and *uncertainty*. In his words, Holton concluded that risk "is exposure to a proposition of which one is uncertain" (p.22).

Holton (2004) highlighted an interesting point in relation to the condition of risk and made clear distinction in regard to the actual *bearer* of risk and the *conduit* through which risk is borne. To illustrate, Holton argued that risk is a condition of individuals who are self-aware like human beings and animals. Thus, organizations, companies, and governments are incapable of being at risk since they are not self-aware. Instead, they are merely conduits through which individuals such as members, investors, employees, voters, and the likes assume risk. Hence, institutions like companies are not risk takers as commonly recognized by financial risk management literature.

A case in point is the imposition of increased accountability of managers through the Sarbane-Oxley Act in the US and Japan which increases those managers' career risk but tends to reduce price risk for shareholders. This scenario suggests the existence of a possible conflict of interest among the various stakeholders in otherwise a seemingly noble idea and straight forward situation of managing risk. In view of this context, Holton (2004) begged the question to the field of financial risk management as to whose risks are actually being managed?

Despite the definition of risk in the dimensions of exposure and uncertainty, Holton (2004) acknowledged that his definition of risk is inadequate from an operational standpoint. This is because the notions of exposure and uncertainty are intuitive, hypothetical, and unobservable. According to Holton, in the case of exposure, one can be exposed without being aware of the exposure. In the case for uncertainty on the other hand, one can be uncertain without realizing it. Holton argued that exposure and uncertainty that are not perceived cannot be defined operationally. As such, he stressed that it is impossible to operationally define risk although he reckoned that one can operationally define the *perception* of exposure and uncertainty, hence operationally define his *perception* of risk. In this light, Holton (2004) concluded that there is no true risk.

In the absence of true risk, practitioners of finance employ subjective probabilities to operationally define perceived uncertainty. Industry practitioners also embrace utility or state preferences to operationally define perceived exposure. However, since perceived risk presents itself in various forms, it is rather challenging to operationally define it. As an optimized solution, industry practitioners operationally define certain *aspects of perceived risk*. For instance, Markowitz used risk metrics to define specific aspects of perceived risk, e.g. variance of return or maximum likely credit exposure (Holton 2004). In present days, industry practitioners employ various risk metrics in financial application such as setting risk limits, trader performance-based compensation, portfolio optimization, and capital allocation. In the application to set limit to market risk for instance, the popular risk metrics to employ are delta, beta, and value-at-risk (Holton, 2004).

A bigger question remains though. That in the absence of true risk, how can one quantify risks that cannot be perceived? Are risk metrics still useful and representative in the case that they might not reflect some of the unperceived risks in a particular application? Holton (2004, p.24) opined that it is meaningless to ask the above questions. What is more important and pertinent to ask is that whether a risk metric is useful, and that whether the use of risk metric in a given application will "promote behavior that management considers desirable".

2.1.4 The Application of Risk

The application of risk in finance discipline was made prominent by Harry Markowitz's theory of portfolio selection. In his 1952 paper nonetheless, Markowitz did not explicitly offer the definition of risk. Rather, Markowitz (1952) implied risk with the term "variance of return" as "an undesirable thing" through the proposed investing rule which stipulates that (Markowitz quoted by Holton, 2004, p.21):

> *"... the investors does (or should) consider expected return a desirable thing and variance of return an undesirable thing" (p.77).*

Perhaps Markowitz's (1952) closest inference to the definition of risk was spelt out when he further wrote to describe that many authors "treat risk as akin to variance of return" as follows (Markowitz quoted by Holton, 2004, p.21):

> *"The concepts 'yield' and 'risk' appear frequently in financial writings. Usually if the term 'yield' were replaced by 'expected yield' or 'expected return', and 'risk' by 'variance of return', little change of apparent meaning would results" (p.89).*

Holton (2004) noted that these two statements from Markowitz (1952) suggest that variance of return might be a proxy for risk.

At present, there are many other definitions of risk and uncertainty that vary by specific application and situational context (Hubbard, 2009). For instance, the Occupational Health and Safety Advisory Services[2], defines risk as "the product of the probability of a hazard resulting in an adverse event, times the severity of the event" OHSAS (2007). In another definition, the term "risk" is referred to as the future issues which can be avoided or mitigated, rather than present problems that must be immediately addressed.

In finance, risk is often defined as the unexpected variability or volatility of returns. This variability of returns includes both the worse-than-expected as well as better-than-expected outcomes. Some refer to this upside "better-than-expected" variation as "positive risk" whilst to the downside "worse-than-expected" variation as "negative risk". Conventionally, industry practitioners regard the computation of the standard deviation of the historical returns or average returns of a specific investment as providing some historical measure of risk (Ross et al., 2002; Vaughan, 1997; Van Horne, 1980).

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[2] OHSAS is a UK-based multi-disciplinary organization with expertise in a comprehensive range of occupational health and safety skills. Occupational Health & Safety Advisory Services (OHSAS) was formed in January 2001 through a merger of NHS Occupational Health and Safety Services of Fife and Tayside. The merger gave OHSAS autonomy while allowing it to remain within the structure of the NHS. See http://www.ohsas.org.

In statistics, risk is regularly plotted to the probability of some events which is seen as undesirable. The probability of that event to happen and assessment of its potential loss of value (expected harm) is computed to provide an interpretable perspective for the making of some decisions toward the event. For instance, in statistical decision theory, the risk function of an estimator for a parameter to be calculated from some observables can be expressed as the expectation value of a loss function as follows:

$$R(\theta, \delta(x)) = \int L\,(\theta, \delta(x))\, f(x|\,\theta)\, \delta x$$

where

$\delta(x)$ = risk function of an estimator;

θ = a parameter;

x = some observables;

L = the expectation value of the loss function.

This approach to risk is frequently applied in the insurance industry in determining the premium paid by policyholders for a particular policy to be underwritten (Nowak, 2009; Berger, 1985; Almer, 1963).

In information security, a risk is viewed in relation to the integrity of an asset. Risk is present when there are threats that will cause vulnerability to impact the asset, e.g. virus attack (threat) through email attachment (vulnerability) to computer hardware, software, and stored data (asset). Hence, risk is then assessed as a function of three variables, namely (i) the probability that there is a threat (e.g. fire), (ii) the probability that there are any vulnerabilities (e.g. inflammable materials like paper), and (iii) the potential impact to the business (e.g. system down or monetary loss) (CASRAG, 2005).

2.1.5 Risk, Insurance, and Risk Management

Knight (1921) categorized risks into insurable and uninsurable risks. Insurable risks are those risks that entrepreneurs can get rid of by buying insurance policy to protect them from potential loss owing to the underlying risks. Insurable risks expose the firm to volatility which moves in single direction, i.e. downside direction. In other words, the risks offer only chance of loss, and with no gain. It is this single direction volatility that becomes the defining characteristic of such insurable risks. Such risks are often called 'pure risk' (Doherty, 2000). Examples of such pure risks are damage to property due to hazards such as fire or flood, operating failures such as lost production, computer malfunction, mechanical breakdown, and liability settlements, to name just a few. Note that *pure* risks are different from *speculative* risks. Speculative risks are commonly linked to finance, investment, and other business activities. The uniqueness of speculative risk is that it can be viewed as either a threat or an opportunity, depending on a person's averseness toward risk. Hence, speculative risks are not eliminated but exist either to be avoided or to be taken advantage of (King, 2000).

Insurance is defined as the equitable transfer of the risk of a loss, from one party (called the 'insured') to another (called the 'insurer'), in exchange for a premium. The practicality of this is to combine loss experience by all members who transfer such risk through the provision for payment of losses from funds contributed (premiums). In the perspectives of law and economics, insurance is a form of risk management principally used in hedging against the risk of a contingent loss. In the same context, insurance can also be thought of as a guaranteed and known small loss, i.e. from the premium paid to insurer, to prevent a large and possibly devastating loss, i.e. from the uncompensated actual loss incurred (Baranoff, 2004).

Insurance has long been used by corporations to manage property, liability, and related insurable risks (Doherty, 2000). The reliance on insurance had given rise to a rather narrow definition of risk management in the early days of corporate management history that in retrospect, the situation seemed to be aptly fitted into Knight's (1921) description that profit was the reward entrepreneurs earned for bearing uninsurable risk. It is from here that historically risk management has been embodied by insurance and internal audit functions. The function of risk management also takes a narrow focus on hazard and operational risks (Stokes, 2004) with the second characteristic of insurable risks that they are often under the control of the policyholder. Having this control capability enables the firm to develop risk management strategy to reduce or avoid risk (Doherty, 2000). For instance, a firm could reduce volatility and the expected value of losses by influencing the probability of its property that would be damaged by fire or floods, or the probability that it would be sued for defective products, environment contamination, or the tortuous activities of its directors and officers. This could be achieved through investing in safety, quality control, or hazard education. In this respect, thus, health and safety might be put under the purview of risk manager's or at least be coordinated with his or her activities (Doherty, 2000).

Risk management took to the mainstream of corporate management history during the period of the 1960s and 1970s when managers explored broader options for managing 'insurable risk' (Doherty, 2000). The progression of risk management has enhanced the sophistication of managers in realizing that insurance is not the only strategy in managing insurable risk. The alternative strategy calls for a substitute source of finance to pay for losses replicating the function of insurance. These alternative sources of finance can come from the firm's cash, borrowings, or fund raised from the issuance of new equity. This strategy would entail the setting up of an internal funding mechanism to support it. According to Doherty (2000), this funding approach is usually formalized by the setting up of a 'subsidiary, or captive, insurance company' by the firm. Through this method, the pricing of risk can be initiated thus facilitating the payment of premium to the captive. Meanwhile, a formal loss settlement process can also be implemented.

Risk management for 'insurable risk' and the concept of enterprise risk management were featured prominently in the work of Robert Mehr and Bob Hedges in the 1960s (Druml, 2008; Doherty, 2000). Mehr and Hedges' publication entitled "Risk Management in the Business Enterprise" was the first text to completely address the subject of business risk (Druml, 2008). Mehr and Hedges's (1963) text can perhaps be regarded as the antecedent or foundation to the application of the concept of *enterprise risk management* (ERM) which is gaining currency in the present days. They are hence widely acclaimed as the fathers of risk management (Druml, 2008). According to Mehr and Hedges (1963), the following initiatives can be undertaken to manage risk:

- transfer risk to a counter-party by purchase of an insurance policy or financial hedge.
- retain risk in either an active or passive way. Simply not insuring is retaining risk. But the firm can mimic the insurance process by self insuring with internal pricing, reserving, and loss settlements.
- reduce risk by investing in sprinklers, smoke alarms, inspections, and other safety measures.
- avoid risk by not undertaking activities that are risky or by substituting less risky processes.

(Mehr and Hedges quoted by Doherty, 2000, p.4). The above initiatives highlight the methodological approaches in handling risk, i.e. *transferring, retaining, reducing*, and *avoiding* risk. According to Doherty (2000), the conceptual work of Mehr and Hedges has propelled the evolution in the industry practice by expanding the function of the "insurance manager" of the firm into the broader role of "risk manager". Mehr and Hedges (1963) asserted that the active management of the entire business risks could maximize efficiency which in turn would result in greater productivity. As such, all business risks should be given due attention and actively managed, instead of merely managing those risks that are insurable or just the insuring itself (Druml, 2008). Mehr and Hedges (1963) further presented the following steps for the risk management process to be adopted by enterprises (D'Arcy, 2001):

i. Identifying loss exposures

ii. Measuring loss exposures

iii. Evaluating the different methods for handling risk

   a. Risk assumption

   b. Risk transfer

   c. Risk reduction

iv. Selecting a method

v. Monitoring results

Recent development in corporate risk management strategy saw risk management process expanded rapidly especially with the banking sector. In banking fraternity, risk management process encompasses the rigorous quantification and mitigation of financial risks (Stokes, 2004).

2.2 EVOLUTION OF RISK MANAGEMENT

2.2.1 Development of Corporate Risk Management

There was little discussion about risk before the 1970s as it was either being concealed or not recognized. Hence its effects on businesses and projects were ignored (Merna and Al-Thani, 2008). During the period, risk and uncertainty were regarded as "a necessary evil that should be avoided" (Merna and Al-Thani, 2008, p.40 quoted Archibald and Lichtenberg, 1992). In the 1970s, project risk management grew rapidly in the area of quantitative assessment. Its development then expanded fast into methodologies and processes (Merna and Al-Thani, 2008).

Risk management was generally recognized as a specific topic in the project management literature in the early 1980s (Artto, 1997). The practice of risk management in project management was well documented in the dimensions of risk identification, estimation, and response (Lifson and Saifer, 1982; Chapman, 1998). During this time, the discussion on risk management was tied to quantitative analysis such as the Program Evaluation and Review Technique (PERT) type of triple estimates, and optimistic, man, pessimistic, and etc. The principal project risk management applications gave emphasis in time and cost objectives, as well as in the feasibility studies of the project (Merna and Al-Thani, 2008).

Risk management became the managerial 'buzz word' in the capital markets in the late 1980s and early 1990s. Risk management was widely practiced by financial firms in the management of portfolio risk for the investor. The pervasiveness of risk management was due to the prevalent financial innovation with the growth of derivatives markets such as options, futures, and related markets (Doherty, 2000). Facilitating the rapid growth of the derivative markets during the periods was due to the work of Fisher Black and Myron Scholes whom in the early 1970s developed the options pricing techniques, i.e. the renowned Black-Scholes options pricing model. Such options pricing model had offered transparency into the options' pricing mechanism to the buyers and sellers of the options contracts and assisted them to enter the trade with great confidence and without much hesitation. It is due to this rapid development in the derivative markets nonetheless, risk management over time has been increasingly understood and referred to as the process of managing a corporation's exposure to financial risks (Doherty, 2000).

Since then, corporate risk management has undergone "dramatic fundamental and far-reaching changes" (Stokes, 2004). Its focus and emphasis have also shifted from the traditional treasury and insurance departments towards line management. Subsequently, corporate risk management finds its way to the boardroom when risk is treated in a much broader enterprise-wide perspective. Having said that however, the degree and manner in which risk management is integrated into firms' day-to-day operations and culture vary significantly. Some firms view risk management as nothing more than a regulatory compliance issue whilst others may treat it more strategically with sophisticated responses to the challenges amidst the ever changing business landscape (Stoke, 2004).

According to Merna and Al-Thani (2008), although most of the risk management methodologies developed in the 1980s continued to be used today, the application of questionnaires and checklists was a great development in the 1990s. Furthermore, the advancement of the application of questionnaires and checklists has also contributed to the concept of knowledge-based systems. Merna and Al-Thani (2008) further pointed that those important principles developed in the 1980s such as that in regard to the contractual allocation of risk have persisted into the 1990s. For example, the strategies of partnership and alliance have been formulated to prevent traditional contractual rivalry and instill a risk and reward sharing approach especially in the area of capital projects. It is also notable that the conventional concentration of quantitative risk analysis of risk management practice in the 1980s has been shifted to the understanding and improvement of risk management processes in the 1990s. For instance, whilst project risk management software was widely applied as an analysis tool in the 1980s, the current trend is to employ risk quantification and modeling as a device to enhance communication and response planning teamwork instead of merely for analysis (capture and response). Risk quantification and modeling techniques are viewed as a method to improve both insight and knowledge regarding a project and as a conduit to relay that information to the project team members and relevant stakeholders (Merna and Al-Thani, 2008). This efficacy of risk quantification and modeling techniques has a positive impact on reducing informational asymmetry among various stakeholders in relation to the project.

A prescriptive approach to risk management processes has become increasingly prominent after 1990. Many advocates proposed risk management processes as follow (Merna and Al-Thani, 2008, p.42):

- the simple generic risk management process – identification, assessment, response and documentation
- the five-phase generic process – process scope, team, analysis and quantification, successive breakdown and quantification and results.

Risk management in the present days sees the emphasis on an enterprise-wide approach of risk management methodology and processes. This is a contrast to the traditional way which looked at risk management in a rather fragmented manner. More and more organizations have realized that adopting a more holistic approach to risk management will make a better sense and work better. More advanced organizations in risk management have set up risk committees, which function to oversee the entire risk management operations across their organizations. Such committees are often chaired by a senior board member or a risk facilitator (Merna and Al-Thani, 2008).

2.2.2 Risk Management as a Management Discipline

Until recently, risk management in its many forms is not regarded by managers as a management discipline (Thompson, 2003). The meaning and application of risk management are often misunderstood at many levels of management. What has inclined to transpire is that the paradigm and execution of risk management initiatives by risk managers are strongly influenced by the biasness of the managers' individual expertise and perspectives. This biasness comes in the areas of financial markets, occupational health and safety, insurance, project management, technology, and political risk management. Albeit so, Thompson (2003) did not think there is anything wrong with these approaches of risk management. But he highlighted that the weakness of it lies with the fact that their focus is limited and lacks an integrated framework. Hence, establishing a common framework for all types of operational risks will tremendously enhance the acceptance of risk management as an effective management tool throughout organizations (Thompson, 2003).

One plausible cause to the above observation could be due to the fact that conventionally the analytical and statistical issues revolving the treatment of pure risks[3] are at variance with those surrounding other production cost and revenue uncertainties. This variation has entailed that pure risk costs[4] and production costs to be distinct. Thus optimal production decisions can be made by treating these factors in isolation as opposed to combining them. As a result, risk management has been separated from the rest of financial theory (Mehr and Forbes, 1973).

Financial theory relates to the administration of the overall assets and liabilities of the firm with the goals to maximize shareholder wealth and other business objectives. Whereas risk management has evolved from the insurance field and insurance traditionally has been alienated from the other business disciplines. The separation lies with the fact that the normative theory of risk management decision models which are drawn from the insurance field may prescribe a formal rule of conduct for making a decision regarding the amount of the insurance deductible, hence the insurance coverage and premium to be paid. But these models fail to recognize the behavioral realities of the conflict that exist between internal management and shareholder interests.

[3] Pure risks concern those events which usually involve only financial loss to a firm. These include destruction of property, theft, credit losses, death or disability of employees, legal liability, and failure of suppliers to perform (Mehr and Forbes, 1973).

[4] Pure risk costs include insurance premiums, administrative costs involving pure risks, costs involved in loss reduction or prevention, and the difference in the present values of the firm before and after a loss not compensated by insurance or other sources such as tort recoveries (Mehr and Forbes, 1973).

To illustrate, the internal management would usually give priority to the long term survival of the firm thus securing the managers' career whereas the shareholders would emphasize in short-term wealth maximization objectives via the increase in share prices. These differences are reflected in complex corporate objectives relating to profitability, growth, solvency, and social responsibility. The conflicting goals are further manifested in such subsidiary matters as the trusteeship concept, satisficing, and maintenance of financial mobility (Mehr and Forbes, 1973).

Besides, normative theory also assumes uniformity among corporate objectives. This notion spells problem because firms may impose varying penalty and reward systems upon different forms of risk management conduct. For instance, whilst some firms may give emphasis to social responsibility hence aiming for low incident of industrial and other accidents regardless of cost, other firms may emphasize in profitability thus willingly to face moderate occurrence and severity accident rates if this strategy leads to reduction of total operating costs which include lower insurance premiums (Mehr and Forbes, 1973).

In this light, Mehr and Forbes (1973) examined the risk management decision in an enterprise-wide environment, or in their words: "in the total business setting", in an attempt to "recast risk management theory in light of the complex objectives of modern corporations" (p.389). Mehr and Forbes (1973) stressed that the design of the risk management function must begin with understanding the business objectives as well as possessing the insight on how these business objectives interact with the decision making process. One has to realize that corporate objectives are multiple and complex. Whilst some are complementary, the others may be conflicting with one another. As such, it is imperative to understand that business decisions are rarely based merely upon a single criterion, but a combination of objectives is weighed and balanced. This in turn is what determines the corporate behavior.

In addition, Mehr and Forbes (1973) criticized the study of pure and dynamic[5] risk behavior in a compartmentalized manner. According to them, in the context of modern financial theory (MFT), this traditional approach to risk management decision will at best result in "non-optimal business decision" and at worst causes "a complete disregard for the pure risk cost" as a result of such decision. This is because the MFT views the firm as an integrated unit hence all of the cost and revenue dimensions of a business issue are to be analyzed concurrently. Due to this argument, Mehr and Forbes (1973) advocated that risk management theory needs to merge with traditional financial theory for an appropriate model so that the decision making process can bring added realism. In other words, risk management should be incorporated into the mainstream of financial theory where risk management decision should be integrated directly into the corporate decision making processes within the firm which according to the MFT, functions in its totality.

As an example, in the capital budgeting model to determine the internal rate of return, the model ought to recognize and merge pure and dynamic risk theory. Mehr and Forbes (1973, p.398) found fault at the conventional treatment and implicit assumptions of the model where:

[5] Dynamic risks are risks arising from perils which result in either gain or loss to a firm (Mehr and Forbes, 1973).

(i) *all of the pure risk cost associated with a project are summarized in terms of premium outlays*, and

(ii) *insurance exactly replenishes the preset value of the net cash flows lost because of the occurrence of a peril.*

Mehr and Forbes (1973) highlighted that the above assumptions are invalid for two reasons, namely (i) some pure risks are not insurable, and (ii) insurance does not entirely indemnify an insured risk in the event of a loss. Owing to this, the present value of the firm may not remain the same before and after the loss even with the presence of insurance as otherwise the concept of indemnification of an insurance policy would assume.

In supporting the call for a holistic and integrated theory to risk management and corporate decision making processes, Mehr and Forbes (1973) pointed out that the modern executive has a more holistic view in solving his business concerns rather than through the thin lenses of specialization. The executive hence has become a generalist who employs both qualitative and quantitative methods to decision making. This approach concurrently place equal importance to financial, accounting, production, and marketing dimensions of a problem. Besides, the generalist executive's responsibilities comprised of integrating the firm's operations as opposed to managing a narrow circle of subordinates. The executive's information systems on the other hand, are devised to swiftly supply accurate and pertinent data as inputs to settling multi-dimensional setbacks of the firm's operations. Thus, an integrated risk management model which incorporates risk management theory with traditional financial theory will work well within a firm that operates as a totality. The integrated model will assist the executive to achieve his objectives by facilitating the exercise of his controls in directing the firm's operations in a holistic and unified manner (Mehr and Forbes, 1973).

2.3 THE CONCEPTS OF CORPORATE RISK MANAGEMENT

2.3.1 The Definition

Risk management is of paramount important in running a business. According to Meagher and O'Neil (2000), risk management is simply about being equipped to handle the outcomes of uncertainty. Cummins et al. (1998), roughly defined risk management as "any set of actions taken by individuals or corporations in an effort to alter the risk arising from their primary line(s) of business". Looking from another perspective, Cummins et al. (1998) also referred risk management as decision making process where an individual or firm endeavor to alter the risk/return profile of future cash flows. In this respect though, Cummins et al. (1998) explained that altering a firm's future cash flow can work along both ways in terms of reducing as well as increasing the firm's risk exposure. Those actions undertaken by managers to reduce risk are referred to as hedging whilst actions undertaken to expose firm to more risk with the hope that such a strategy will bring abnormal profits are referred to as speculating.

According to Doherty (1985), risk management is concerned with the financing of the firm's investment activities and can promote efficient investment decisions.

Miller (1992), on the other hand, pointed out that a firm can employ either financial or strategic approaches in response to managing risk exposures. Financial risk management techniques involve the reduction of corporate exposures to particular risks without changing the firm's strategy whilst strategic responses generally impact a firm's exposure across a wide range of environmental uncertainties.

Meulbroek (2002) pointed out that the objective of risk management is to maximize shareholder value.

Handy (1999) on the other hand, summarized risk management as follows (Merna and Al-Thani, 2008, p.44 quoted Handy, 1999):

> *Risk management is not separate activity from management, it is management... predicting and planning allow prevention... reaction is a symptom of poor management.*

Smith (1995) describes that risk management is a crucial part of the project and business planning cycle which:

- requires acceptance that uncertainty exists
- generates a structured response to risk in terms of alternative plans, solutions and contingencies
- is a thinking process requiring imagination and ingenuity
- generates a realistic attitude in an investment for staff by preparing them for risk events rather than being taken by surprise when they arrive.

Merna and Al-Thani (2008, p.44) concluded that risk management at its most fundamental level:

> *...involves identifying risks, predicting how probable they are and how serious they might become, deciding what to do about them and implementing these decisions.*

2.3.2 Risk Management Strategy

2.3.2.1 Risk Reduction and Cost of Risk Reduction

There are two generic types of risk management strategy available to firms (Judge, 2006). In the first strategy, the firm can attempt to reduce the risk itself. Alternatively, the firm can reduce the cost of the given risk that it faces. The former strategy of risk reduction comes in several forms. For instance, the firm can enter into insurance for hedging insurable risk. Other examples are the hedging of financial risk by means of using hybrid debt securities, ensuring geographical and product diversification[6], altering the fixed-floating debt mix or the currency debt mix, and lowering operating gearing. All these are on-balance sheet activities. Apart from that, financial price risk such as those of interest rate and foreign currency risks can be hedged using financial derivatives. The use of financial derivatives is generally specific to the risk exposures or sources (Judge, 2006).

[6] This is a totally passive strategy. If risks from various sources are less than perfectly correlated, they are sub additive. If no corporate risks are hedged, this strategy enables the achievement of some degree of natural diversification for the firm.

The objectives of using financial derivatives are analogous to the argument made by Merton (1993). Merton (1993) suggested three ways to moderate risk, namely by (i) diversifying it, (ii) selling (or hedging) it, or (iii) insuring against it. Merton (1993) cited an analogy of the owner of a ship to describe the above approaches. According to him, a ship owner can (i) diversify by buying a portfolio of ships to circumvent a total loss if one ship sinks; (ii) sell (or hedge) the ship and have no economic exposure to its subsequent outcome; or (iii) buy an insurance policy that compensates if the ship sinks, but at the same time allows the ship owner to profit if it does not. The term hedging referred to by Merton (1993) meant entering into a position such that the payoff is the same despite of the outcome, which could be achieved by way of either selling the ship today or entering into binding forward contract to sell it at some time in the future (Judge, 2006).

The second strategy of risk management involves the reduction of the cost of risk (Judge, 2006). This strategy serves as a substitute for the comprehensive hedging strategy in which all sources of risk are hedged, such as that of financial price risk. However, the cost reducing strategies are not risk source specific like those of risk reducing strategies. Nonetheless, this strategy can be executed in various ways. One method is the lowering of the firm's gearing. For instance, a firm can issue more shares to increase its capital base. A higher level of equity (or lower gearing) can reduce the costs of risk since equity capital providers are residual or variable claim-holders. Equity providers or shareholders have a claim to the proceeds of investment only after firms' prior claims have been met. As such, equity capital acts like a cushion to absorb the firm's losses due to risks. Thus, the strategy to reduce the cost of risk may involve the firm's capital structure or financing policy (Doherty, 1995; Merton, 1995; Judge, 2006).

2.3.2.2 Actual Capital and Contingent Capital

According to Judge (2006), both risk reducing and cost reducing strategies entail the provision of either actual or contingent capital. For instance, a firm can transfer its business and financial risks to shareholders in return for upside exposure of the firm by issuing equity. On the other hand, a firm can transfer its risk to bondholders or creditors in exchange for the promise to pay periodic coupon or interest payment and repurchase the risk at some point in the future when it is financially solvent by issuing bond or other debt instruments. Alternatively, a firm can expect to receive some contingent capital in the event of a specific loss by buying insurance. A premium is paid by the firm against the specific risk being insured in exchange for such contingent capital. Similarly, a firm can buy foreign exchange options with premium in exchange for contingent capital. If the options expire in-the-money, the contingent capital will turn into capital.

Thus, the risk reducing strategies via those of hedging and insurance depicts the generation of contingent capital during the time it is most needed, i.e. with the manifestation or realization of the risks being insured or hedged against. On the other hand, the description of risk reducing strategies through issuing debt and equity presents the provision of actual capital. However, it must be noted that the expected generation of contingent capital through derivatives like hedging and insurance does not come without the reciprocal contingent loss (Doherty, 1995; Shimko, 1996; Judge, 2006). The contingent loss is due to the presence of credit risk. For instance, risk exists that insurers and counterparties in the derivative contracts may not be able to honor their part of the obligation to pay up the expected contingent capital when needed. Therein lies the main difference between contingent capital and actual capital to the firm. Another advantage of actual capital over contingent capital is that the former can be utilized by the firm at the very moment of the issuance of such securities, i.e. shares and bonds.

2.3.2.3 Capital Structure and Cost of Risk Reduction

Traditionally, corporate risk management has given emphasis in actual capital. Specifically, the management of actual capital is in the form of equity as it provides a form of protection or 'cushion' against the firm's business risk. The managerial maneuvering is to raise extra capital above what is necessary for the funding of the physical investment and working capital to keep the firm afloat. This capital has commonly been raised through equity. In other instances capital in the form of debt which is subordinated to customer contractual claims has also been issued. This additional reserve of capital will become useful in absorbing the losses incurred should the firm's risk materializes (Merton, 1995).

When actual capital is involved in risk management strategy, the firm will be primarily concerned with the reduction of the cost of risk. In other words, the preoccupation with the reduction of the cost of risk will relate to the firm's capital structure or financing policy strategies. The use of actual capital in the form of equity is an attractive method in managing the firm's risk for reasons that have been mentioned earlier, that is, equity-holders are residual claim-holders whose claim to the investment proceeds will come only after the firm's prior claims have been met.

As such, in the event where prior claims are higher than those expected, adverse outcome which gives rise to losses will happen. Under such circumstance, equity will absorb those losses. This essentially means that equity will protect the firm against all forms of risk. Hence, a higher level of equity in the firm's capital structure, i.e. lower gearing, is able to lower the cost of risk in several ways as below (Doherty, 1995; Merton, 1995; Shimko, 1996; Judge, 2006).

Lowered gearing decreases the chances of bankruptcy and hence minimizes the expected costs of bankruptcy. In the case of high gearing, the ex ante expected value of debt instruments such as bonds will be netted out correspondingly to reflect the higher risk involved as creditors and bondholders alike will bear the bankruptcy costs ex post. Thus, lowering the risk of bankruptcy through reducing gearing on the part of the firm will reduce the price of issuing such debt instruments. One instance to minimize the probability of bankruptcy is for the firm to hold more liquid assets on its balance sheet (e.g. cash balance and short-term investments) to ensure ample funds are available to satisfy debt claims. This will result in lowered net gearing where liquid assets serve as negative debt (Merton, 1995).

Another way of reducing the cost of risk is through lowering dividend payments to avoid financial distress. This approach calls for the firm to raise its capital via issuing preference capital instead of debt. According to Nance et al. (1993), a firm can choose to postpone the dividend payment due on preference capital if necessary without invoking any threat of insolvency. This is in stark contrast to the deferment of interest payment on debt which could trigger insolvency. However, there is an opposing view to this argument. Geczy et al. (1997) pointed out that the use of preference capital increases the firm's effective debt because the characteristics of preference capital behave more like debt than equity. Its use therefore, will lower the borrowing capacity of the firm. As a result, the use of preference capital will limit the availability of the less costly external funds such as debt to the firm. This also implies a more reliance on costly new equity issues by the firm for its funding needs.

The use of actual capital in the form of equity (low gearing) will lower the potential conflict of interest between shareholders and bondholders in selecting investment projects. In other words, high gearing in the firm's capital structure will create a problem of adverse selection on the part of shareholders for choosing investment projects. For instance, shareholders relatively have limited liability in a high gearing situation and this essentially creates a put option for them where shareholders possess the option to put the firm to the bondholders in the case of bankruptcy. It is due to this fact that shareholders tend to underestimate the net present value (NPV) of the chosen investment project by the value of this put option. Note that the put option has value if the firm is bankrupt or has a high probability of financial distress. Furthermore, since shareholders have effectively a call position on the value of the firm, the consequence of adverse selection will prompt them to select high risk projects ignoring the downside risk for this risk is basically borne by the bondholders. The consequent of these distortions in project selection is lowered firm value. In this respect, the higher the level of gearing or the risk with the firm's cash flows, the greater the loss in firm's value. As such, it follows that with the reduction in the firm's gearing, hence the risk, it will result in improved investment project selection and thus, enhanced firm value (Doherty, 1995; Merton, 1995; Shimko, 1996; Judge, 2006).

Risk management strategy that relies on actual capital instead of contingent capital, i.e. hedging with derivatives, will mean that the funding of unhedged financial price losses entails the foregoing of other investment opportunities, hence the opportunity costs. Otherwise, new capital has to be raised with the attendant issue costs. To illustrate, when a financial price loss occurs, the firm is forced to divert internal funds away from a new investment project or it has to raise new capital in order to fund both the investment project and the loss. However either choice incurs hefty costs as the nature of risk management strategy using actual capital does not create contingent capital like that of hedging.

Hedging enables the firm to stabilize the availability of internal funds thus to avoid unnecessary fluctuation in either investment spending or external financing. The situation is well described by the *pecking order hypothesis* where it posits that internal funds are less costly than external funds, and that external debt is less costly than external equity (Myers and Majluff, 1984). Taking hint from the pecking order hypothesis, a firm can maintain its capacity to undertake positive NPV investments by having low levels of gearing through large equity shield. The large equity in the firm's capital structure is not only able to absorb or cushion unhedged losses, the low level of gearing will also not impair the firm's capacity to borrow (external debt). This enables the firm to fund new investment projects and unhedged losses without having to resort to the issuance of costly new equity (Myers and Majluff, 1984; Doherty, 1995; Merton, 1995; Judge, 2006).

Not all are agreeable to the arguments which assert the reduction of the cost of risk through lowering the level of debt in the firm's capital structure. For instance, Leland (1998) cited tax deductibility of interest payment as the principal benefit of utilizing debt in the firm's capital structure. The use of debt instruments is argued to enhance firm value under this model. Moreover, the use of certain debt instruments such as convertible debt in place of straight debt is argued to be able to rein in agency problems and address the adverse selection issue of investment project selection as discussed earlier whilst enjoying the tax benefits. The conversion option of convertible debt instruments permits such debt holders to convert their debt securities into a specific number of the firm's shares. The conversion option is *in the money* if the firm's share price rises to a level where shares obtained from such a conversion have higher value than the original debt securities. Green (1984) indicated that this conversion feature attached to the debt securities helps *straighten out* the payout function of investment projects such that payouts to different stakeholders, i.e. equity and debt holders, are more closely aligned, thus minimizing the distortions of investment project selection. Owing to this, debt instrument is more sensitive to firm value changes than its straight debt counterpart which in turn, mitigates the sensitivity of equity value to firm value changes. As a result, the use of convertible debt enables the lessening of incentive conflict among various stakeholders in the firm.

One way of mitigating incentive conflict with the use of convertible debt is through *ungearing*. Ungearing can take place during the time when the firm is performing well and also when the firm is not performing well. It all depends on whom the conversion option is granted. For instance, when the firm is doing well and the share price enhances, holders of conventional convertible bond will find it sensible to convert their bonds to shares (equity), thus ungearing the firm's balance sheet. On the other hand, in the case where the convertible debt is issued and where the option is granted to the firm, the firm then can recall the debt when the debt becomes a financial burden or during the period in which the firm faces financial distress. This again will ungear the firm's balance sheet. Doherty (1995) referred to this type of convertible debt where the option is granted to the firm as the *reversible convertible dent* (RCD) (Judge, 2006).

The agency problems literature points to two types of conflicts of interest in a firm, namely (i) conflict between stockholders and managers, and (ii) conflict between debtholders and stockholders. Conflicts between stockholders and managers occur when managers pursue their own personal interest at the expense of stockholder wealth (Sung et al., 1994). This problem can be mitigated with debt financing by granting debtholders the option to force liquidation if the firm's cash flows are poor (Harris and Raviv, 1990). Otherwise the availability of free cash flow to managers is limited to prevent them from engaging in activities that benefit their own interest (Jensen, 1986; Stulz, 1990). On the other hand, conflicts between debtholders and stockholders take place when bondholders experience expropriation of their wealth through unsuitable selection of investment projects by the owners of the firm (Jensen and Meckling, 1976; Myers, 1977). Myers (1977) proposed two solutions to the agency problem between stockholders and bondholders, namely restrictive covenants and renegotiation provisions (Sung et al., 1994).

The agency cost literature such as Myers (1977) pointed out that by shortening the maturity of debt, the firm not only reduces its level of debt but it also mitigates the costs of asset substitution as well as the costs of underinvestment. For instance, since short-term debt facilitates the repricing of debt, bondholders can easily respond to changes in the risk of the firm by adjusting the debt's risk premium. As such, firms have an incentive to choose a low risk investment strategy with short-term debt to minimize the imposition of risk premium on their debt instruments (Myer, 1977). Apart from that, issuers of short-term debt face less risk compared to issuing a long-term one, hence a larger portion of the gains from incremental investment accrue to shareholders instead of bondholders. This scenario has provided an incentive for firms to avoid underinvestment (Myer, 1997; Judge, 2006).

Wall (1989) proposed a hybrid of short-term debt and an interest swap strategy to lower financing cost by allowing high risk firms to reduce their agency costs without incurring interest rate risk. The swap protects the firm from fluctuation in market interest rates whilst allowing the credit risk component to vary. Therefore the firm still faces the possibility of an increase in its risk premium for any shift toward higher risk investments (Judge, 2006). However, a study by Long and Malitz (1983) presented evidence which suggested that firms make short-term borrowing decisions independent of long-term investment requirements. Furthermore, the study also found that firms do not endeavor to resolve agency problems by substituting short-term debt for long-term debt (Judge, 2006).

2.3.3 Risk Management Process

According to Smith (1995), risk management process entails the following four stages:

- identification of risks/uncertainties
- analysis of implications
- response to minimize risk
- allocation of appropriate contingencies.

Merna and Al-Thani (2008) on the other hand pointed out that risk management is a continuous loop as opposed to a linear process. By this it means that as an investment or a project goes through its life cycle, a process of identification, analysis, control, and reporting of risks is constantly being carried out. Despite the increased use of risk analysis and risk management as essential elements of the overall business management approach, there is no established standard in relation to the techniques, factors, and approaches to which reference may be made (Merna and Al-Thani, 2008). As a consequence several organizations and research authorities have provided guidelines with regards to phases associated with risk management process. For instance, Merna (2002) identified three phases, i.e. risk identification, analysis, and response amidst the 15-step sequence to account for risk management. Others such as Boswick (1987), Eloff et al. (1995), the British Standard BS 8444 (BSI, 1996), and the Project Management Institute's (PMIs) *Guide to the Project Management Body of Knowledge* (PMBOK 1996) identified four processes of risk management (Merna and Al-Thani, 2008).

Chapman and Ward (1997) on the other hand suggested eight phases in the risk management process. The eight phases are: *define, focus, identify, structure, ownership, estimate, evaluate,* and *plan.* Chapman and Ward (1997) associated each phase of the risk management process with some broadly defined deliverables. Each deliverable in turn, is presented in the context of its purpose and the tasks necessary to attain it. Merna and Al-Thani (2008) emphasized that the risk management process outlined by Chapman and Ward (1997) should also encompass an enterprise's corporate and strategic business elements in identifying risks at these levels before sanctioning an investment project.

It is recommended that enterprises adopt PMBOK's (1996) project risk management processes as their own ERM processes. The PMBOK (1996) project risk management processes includes risk identification, risk analysis, and risk response. The processes also comprise of capitalizing the results of positive events and minimizing the outcomes of adverse events (Merna and Al-Thani, 2008). Sections 2.3.3.1 to 2.3.3.3 discuss the recommended risk management processes. Note that whilst some parts of the discussion of risk management processes explicitly make reference to that of a project, its inference of the processes extends in similar meaning and manner to both corporate and strategic business levels of the enterprise.

2.3.3.1 Risk Identification

Risk identification involves the determination of particular risks (both internal and external) that are likely to influence the project. The process also includes documenting the characteristics of each identified risk. Each primary source of risk needs to be classified in accordance to their severity of impact on variables such as cost, time schedules, and project objectives. The initial identification of risks can be performed using historical and current information available.

Examples of the inputs to risk identification are: product or service description; work breakdown structure; cost and time estimates; specification requirements; and historical information. Examples of the outputs (deliverables) to risk identification include: sources of risk; potential risk events; risk symptoms; and inputs to other processes. All identified risks which have the likelihood to affect the project shall be properly kept in a register of risks. This shall include a full and validated description of each risk concerned.

The main objectives of risk identification are to: (i) identify and capture the principal stakeholders in risk management, (ii) establish the platform to provide necessary information for risk analysis, (iii) identify the project or service components, (iv) identify the inherent risks in the project or service (Merna and Al-Thani, 2008, p.48).

2.3.3.2 Risk Quantification and Analysis

Risk quantification and analysis consist of evaluating risks and assessing risk interaction vis-à-vis the potential outcomes. It entails ascertaining risk events that require a response from the management. The main output from this process is a list of opportunities that ought to be pursued and threats that require attention and reaction. The outcomes of risk quantification and analysis serve as basis for the enterprise to make decision on the next course of action in relation to a particular risk event. The objective of this process is hence to find the balance that exists between risk and opportunities. Determining the balance between risk and opportunities is crucial in facilitating managerial responses so as "to tilt the balance in favor of the opportunities and away from risks" (Merna and Al-Thani, 2008, p.51).

There are primarily two approaches in risk quantification and analysis process, namely the qualitative risk analysis and the quantitative risk analysis. Qualitative risk analysis comprises of developing a register of risks and a description of their potential outcomes. The evaluations of qualitative analysis do not produce numerical values. Rather, the evaluations help enhance the understanding of the nature of the risks involved. Quantitative risk analysis on the other hand involves numerical data. The numerical data is often analyzed using statistical procedures in the context of mathematical modeling. The analysis is commonly performed with the aid of computer software application (Merna and Al-Thani, 2008).

2.3.3.3 Risk Response

Risk response entails laying out plans to capitalize on opportunities and to respond to threats. Emphasis will be on what appropriate steps to take in response to the risks faced. Enterprises can generally respond to threats in one of the following four manners (Merna and Al-Thani, 2008):

- risk avoidance
- risk reduction
- risk transfer
- risk retention

2.3.3.3.1 Risk Avoidance

Risk avoidance necessitates the elimination of a particular threat. The removal of threat can be done either by eliminating the source of the risk within a project or by excluding projects or business entities from which the source of risk originate (Merna and Al-Thani, 2008). As such, the avoidance option includes simply not performing an activity that could carry risk. An example would be to not travel in a car in order to avoid exposure to the risk of involving in a road accident.

Avoidance is the simplistic way of dealing with risk. Avoiding risks also means losing out on the potential gain that otherwise accepting (retaining) the risk may have offered. For instance, not venturing into a business to avoid the risk of loss also avoids the possibility of earning profits.

2.3.3.3.2 Risk Reduction

Risk reduction entails the lowering of the probability of risk occurrence or the reduction of the severity of the loss should a risk event happen, or both. For instance, wearing of hard hats may reduce the severity of injuries from falling objects in a building site. At the same time, embracing safer working practices can lower the chances of objects falling (Merna and Al-Thani, 2008). Another example is such as sprinklers which are designed to put out fire to reduce the risk of loss by fire.

Acknowledging that risks can be positive or negative, it is therefore imperative to realize that risk optimization must be sought in the process of risk reduction. Optimizing risks means finding a balance between assuming negative risk and having the benefit of expected profit through business operations and activities; or between risk reduction and the loss of profit opportunity.

2.3.3.3.3 Risk Transfer (Sharing)

Risk transfer basically means the process of transferring the risk that an enterprise faces to a third party. In other words, it involves assigning the burden of loss (perhaps as well as the benefit of gain) from a risk to another party. This is done as a measure to reduce a risk facing an enterprise. An example of risk transfer is such as in a contractual risk allocation whereby in a project involving the construction of a facility, some risks related to the construction are transferred from the client organization to the contractor carrying out the work. The risk being involved here may be that of the likelihood for the construction not being able to be completed within the stipulated time frame, hence some monetary losses may be incurred as a result. Financial markets offer various instruments for risk transfer such as derivative contracts used for 'hedging' purposes (Merna and Al-Thani, 2008). Flanagan and Norman (1993) described risk transfer as follows:

Transferring risk does not reduce the criticality of the source of the risk, it just removes it to another party. In some cases, transfer can significantly increase risk because the party to whom it is being transferred may not be aware of the risk they are being asked to absorb.

Some authors prefer to use the words *risk sharing* instead of risk transfer with the belief that it is a mistake to use the words risk transfer. Their argument is that you cannot transfer a risk to a third party such as through the purchase of insurance or outsourcing. This is because the purchaser for such contract generally holds on to legal commitment for the losses "transferred". In this light, insurance may be more suitably described as a post-event compensatory mechanism. To illustrate, a personal injuries insurance policy does not transfer the risk of a car accident to the insurance company. The risk is still present with the policy holder who may get involved in an accident. The insurance policy simply provides that if an accident occurs then some financial compensation may be payable to the policy holder (Baranoff, 2004; Vaughan, 1997).

As such, it should be realized that popular risk transfer instruments such as insurance is only capable of transferring the potential financial consequences of a risk but not the transferring of the responsibility for managing the risk itself (Merna and Al-Thani, 2008).

2.3.3.3.4 Risk Retention

Risk retention involves accepting the loss, or benefit of gain, from a risk when it occurs. Risk retention can be planned or may be unplanned. Unplanned or unintentional risk retention is the result of oversight or failure during the risk identification and risk analysis processes. If a risk fail to be identified or if its potential impacts are underestimated, the enterprise will be unable to consciously avoid, reduce, or transfer it sufficiently, hence the unplanned retention of it (Merna and Al-Thani, 2008).

Planned risk retention consists of an entire or fractional acceptance of the potential consequence of a risk. Every profit-making organization undertakes certain business risks in its daily operations. The manifestation of risk and reward relationship will render it impossible for an enterprise to reap satisfactory return on capital without any risk exposure. Nonetheless, in the name of prudent management, the retained risk should be that in tandem with the enterprise's strategic mission and core value-adding activities. Moreover, the retained risk must also fall within the organization's risk appetite and capability to manage it in a cost-effective manner vis-a-vis external entities. This is because risk transfer and avoidance must essentially cost some premium (Merna and Al-Thani, 2008).

Certain risk may also be retained in such situation as for small risks where the cost of insuring against (transfer) the risk would be larger over the period than the total losses sustained. In the same context, all risks that are not avoided or transferred are retained by default. This includes risks whose potential losses are so huge or catastrophic that either no insurance policy is available or the premiums would be prohibitive. Besides, retained risk is also present in the form of any amounts of potential loss exceeding the amount being insured. This risk response strategy may also be appropriate in the case where the probability of a very huge loss is low or if insuring for greater coverage entails so large a premium that it adversely affects the enterprise's financial standing.

2.4 THEORECTICAL ARGUMENTS FOR CORPORATE RISK MANAGEMENT

The history of risk management started with its application concept in diversification of investor's investment portfolio. Classic finance theory postulates that investors have two primary risk management tools to match their wealth creation activities with their chosen level of risk that suit their unique risk appetite (Belmont, 2004). The first of these tools is diversification and the second is asset allocation. Diversification of portfolio means the exercise of distributing portfolio holding across a greater number of assets (i.e. to include more than one asset type in the investment holding such as combining stocks, bonds, money market instruments, commodities, real estate and etc in order to reduce exposure to risk). The advantages of diversification were first highlighted and analyzed by Harry Markowitz under his Modern Portfolio Theory laid out in 1952. The concept was widely accepted with the subsequent adaptation and application into the development of the Capital Asset Pricing Model (CAPM). Asset allocation, on the other hand, entails the decision of determining the amount of wealth being invested across asset classes. The essence of this exercise is to achieve the optimal combination of expected return and risk consistent with the investor's objectives (Belmont, 2004).

It was not until the late 1980s and early 1990s that the term “risk management’ received wide mention in the capital market. Its application was progressively extended from the initial management of investment risk by portfolio investors to the corporate environment where it was applied in managing corporation’s exposure to financial risks (Doherty, 2000). Justification for corporate risk management can easily be accepted with the intuition that shareholders are risk-averse and their interests are well served if firms manage risk on their behalf. The efficacy of this application of risk management in corporate environment is also backed by finance literature. For instance, studies in the 1980s and 1990s by Demsetz & Lehn (1985), Smith & Stulz (1985), Mayers & Smith (1982, 1987), Amit & Wernerfelt (1990), Froot, Scharfstein & Stein (1993), Froot & Stein (1996), Tufano (1996, 1998), Smithson (1998), Leland (1998), Cummins et al. (1998), saw an emerging paradigm on the role of risk in determining corporate value (Doherty, 2000).

Ironically, it is also with this progression of risk management application from the portfolio investment realm to the corporate management environment that has opened the door to continuous argument among academics. Whilst the notion of value creation through corporate risk management stands well with the older classical models of asset pricing, it seems to be at odds with the new explanation of asset pricing that emerged in the 1960s and 1970s by neo-classical financial theory. The critics of corporate risk management question its efficacy of value creation to the firms, and ultimately to shareholders, who are the owners of the firms.

The notion of investors having access to the two powerful tools of risk management mentioned earlier (i.e. diversification and asset allocation) has formed the basis of argument that investors only benefit from internal firm-specific risk management initiatives if the initiatives increase the present value of the firm's expected cash flow. If this is not forthcoming, the theory holds that internal firm risk management should then focus on managing systematic risk since investors themselves can diversify away firm-specific risk, or unsystematic risk with ease (Belmont, 2004). However, this notion of firms managing systematic risk is also questionable. The classic finance theory holds that, in an efficient market, the hedging of the firm systematic risk, i.e. through engaging in derivative contracts, or the transferring of risk to insurers, are zero-sum games for shareholders. This is because the value created by eliminating this systematic exposure is equal to the cost of the firm hedging it, or the premium for insurance policies (Crouhy et al., 2006; Belmont, 2004; Doherty, 2000a). The irony of these contradicting notions of corporate risk management is further compounded as evidenced by the following literature review:

A study by David Cummins in 1976 which explained risk management in the CAPM realm was an important piece of work in this area. Doherty (2000a) described that this was probably the first serious attempt in finance literature to link risk management with the famed CAPM. The paper showed how a firm could maximize its value by insuring risk, rather then retaining it. Cummins discussed in details on the early works of capital asset pricing model (CAPM) developed by Treynor (1961), Sharpe (1964), Lintner (1965) and Mossin (1966) which had contributed significantly to our understanding of how risky securities are valued by the market (Main, 1983). With this understanding of pricing of risk, it had made it possible for firms to use CAPM approach in their risk management through the decision of insurance purchasing (Main, 1983).

In the study, Cummins (1976) integrated risk management decision variables into the theory of the firm under risk. With this integration, he developed risk management decision rules which were consistent with the firm's overall objectives. According to him, most of the studies of risk management decision rules previously, such as those of Allen & Duvall (1971, 1973), Shpilberg & de Neufville (1975), Neter & Williams (1971), Mortimer (1974), Hartman & Siskin (1974), and Head (1974), "have concentrated on local rather than global optimization" (Cummins, 1976: 588). This, according to Cummins (1976: 588), "may be suboptimal in the context of the firm's broader goal". To overcome this problem, Cummins extended the risk management problem for application in the theoretical construct of CAPM where decision rules were developed for optimal proportional retention, selection of aggregate deductibles and choosing reserving policies.

The study analyzed the trade-off between the benefits of saving on insurance premium through risk management decision process that use deductibles and self insurance (i.e. risk retention) with the increased risk faced by the firm as a result of reductions in the firm's insurance coverage. This increase of risk can be interpreted as in a higher degree of variability in the firm's income stream. The model reveals that "the firm should increase its retention to the point at which marginal rate of substitution between expected return and risk is equal to the market price of risk multiplied by the correlation coefficient between the firm's returns and those of the market" (Cummins, 1976: 607). Cummins concluded by most accounts, it is better for the firm to reduce retention of pure risk, or in other words, the firm should transfer the risk to the insurer. He stressed that the firm must be cautious of the increase in risk accompanying risk retention program for dealing with pure risk. Finally, he construed that the CAPM can be applied as an useful theoretical construct for analysis on the relationships between expected costs, risk, as well as other parameters relevant in risk retention programs.

From the adaptation of CAPM as the theoretical construct, Cummins described firm's equity price in capital market equilibrium which becomes the basis for the firm's risk management decision as follows:

$$P_j = \frac{E(\tilde{V}_j) - S_m \, \rho_{jm} \, \sigma(\tilde{V}_j)}{(1+R_f)} \qquad (1)$$

where

P_j = the equilibrium market value of the j^{th} firm at the beginning of period 1 (in equilibrium, this quantity is being maximized);

$\tilde{V}_j$ = the market value of the firm at the beginning of period 2;

S_m = $\dfrac{E(\tilde{V}_m) - P_m \, (1+R_f)}{\sigma(\tilde{V}_m)}$

$\tilde{V}_m$ = the market value at the beginning of period 2 of the market portfolio;

R_f = the risk-free borrowing-lending rate;

ρ_{jm} = the correlation coefficient between the return on the j^{th} firm and that on the market portfolio

The placement of a tilde over a symbol indicates that it represents a random variable. Cummins' conceptual argument was that firm could employ risk management to affect its valuation through varying its mean and variance of return within limits. This can be achieved by varying the variables $E(\tilde{V}j)$ and $\sigma(\tilde{V}_j)$ in equation (1) by an appropriate mix of self-insurance and market purchase of insurance. Decision rule based on the above model will result in the optimal amount of risk retention (Main, 1983).

However, subsequent debates on Cummins' results suggested that insurance can only add value if the policy is under-priced (Doherty, 2000a). Referring to Cummins' study in 1976, Main (1983) commented that there was a flaw in Cummins' analysis. Main (1983) highlighted that Cummins failed to distinguish the fundamental difference between the type of risk (i.e. systematic risk and unsystematic risk) treated by the CAPM as well as the type of risks that are susceptible to insurance cover. This omission has resulted in fundamental flaw in the way Cummins presented his theoretical argument (Main, 1983). The critics put forth the risk measured in the capital asset pricing model (CAPM) as an important variable in their argument. CAPM model postulates that those risks that could not be diversified away by investors (i.e. through portfolio holding diversification and portfolio asset allocation) would be priced. On the other hand, those corporate risk that could be diversified away would not be priced, as it would imposed no costs on investors (Doherty, 2000, p.9).

To explain further, the neo-classical finance theory[7] postulates that firm-specific risk is irrelevant and that only the covariance of the firm's asset returns to the market portfolio matters which is measured by the *beta* in the capital asset pricing model (CAPM) (Belmont, 2004). Neo-classical finance theory holds that in the perfect and complete market condition[8], investors have full information pertaining to the risks in the firm. As such, investors are able to hedge the firm-specific risk as easily as the firm could itself through diversification of their portfolio holding. As a result, risk management activities by the firm will not make any difference in terms of value creation in relation to what investors are able to do for themselves. This logic is obviously at odds with the concept of corporate risk management. This line of argument can be applied to insurance purchasing by firms. The purchase of insurance policy is a common dimension of corporate risk management whereby risk is transferred to third party, the insurer. Whilst proponents of corporate risk management such as Cummins, Mayers and Smith are in support of insurance purchasing, neo-classical finance theorists hold that insurance premium paid by the firms is costly. The potential benefit gained through

[7] Neo-classical financial theory seeks to derive theories of investment, portfolio selection, cost of capital, capital structure, capital budgeting, and market equilibrium under uniform assumptions of perfect and complete markets with uncertainty. The CAPM and the efficient frontier are elements of Modern Portfolio Theory which in turn, is a part of neo-classical financial theory (Belmont, 2004).

[8] Under neo-classical finance theory, a market is complete if: (1) all streams of cash flows can be traded irrespective of amount, time, structure, and risk profile, (2) a risk-free asset exists whose interest rate is the same for all market participants irrespective of lending or borrowing, (3) costless and complete information leads to homogenous expectations and to the absence of arbitrage opportunities; financial markets are perfect if: (1) there are no differences in information across investors (i.e. markets are informationally efficient and information is simultaneously and fully available to all market players), (2) there are no taxes, (3) there are no transaction costs, (4) there are no costs of writing and enforcing contracts, (5) there are no restrictions on investments in securities (i.e. no limitations on short selling), (6) all market players are price-takers (i.e. the price is the same for all participants and there are no bid-ask spreads) (Belmont, 2004).

insurance coverage will be totally offset by the costly premium paid. It is a zero-sum-game. Hence, no real value will be created for the firms.

The neo-classical finance theorists' view of scenarios was as bad as denying firms' role in risk management under the condition of efficient markets. Hedging diversifiable risks by firms would not create value since they were irrelevant for shareholders. Transferring risks on the other hand, would entail firms to transfer the benefits of such risk management activities to the insurer through the payment of insurance premium. If this scenario is true as portrayed by the neo-classical theory that there would be no net gain, then the need to manage risk will be questionable (Doherty, 2000a).

However, neo-classical finance theory is also at odds with observed reality (Belmont, 2004). Firms, especially those in the finance and banking industry do actively manage risk. This phenomenon can be explained by looking at the market conditions and environment in which these firms operate in reality and by comparing them with the assumptions put forth by the neo-classical finance theory. For starters, firms such as banks' stakeholders (depositors, customers and counterparties) must be convinced that the default risk at the bank is low before choosing to transact with it. Public confident is extremely crucial in certain industries such as banking. This is because banks use a lot of other people's money to do business. Secondly, internal risk management by the firm can be driven by regulatory requirement.

In the banking industry, to ensure minimizing the systemic risk in the industry and to maintain an orderly market, regulators require banks to set aside minimum regulatory capital amount and to demonstrate effective risk management process. The stock exchange commission of the United States requires listed companies to institute rigorous internal control procedure and risk management process under the Sarbane-Oxley Act. Shareholders, on the other hand, do not have full information as to the risk exposure of firms they invest in. Although listed companies are required to disseminate material information to the shareholders by the listing regulation, the information usually did not come in a timely manner. Even if they did, shareholders may not possess the analytical ability necessary to accurately assess the impact of that risk on the share price. This has resulted in informational asymmetries. Under this condition of asymmetric information, coupled with high technology cost and the lack of sophisticated risk measurement skill, investors on their own cannot efficiently hedge for their portfolio holdings (Belmont, 2004). As such, it is not surprising if firms do actively manage their risks with the belief that an efficient internal risk management function can create value for shareholders.

With this observed reality, how does one provide theoretical link to explain the disparity between theory and reality?

Providentially, Mayers and Smith (1982) provided a reconciliatory argument for asset pricing theory and corporate risk management in the early 1980s through their paper on corporate purchases of insurance. They concluded that the addition of insurance contracts could increase the firm's market value. Mayers and Smith (1982: 281) defined corporation as "a set of contracts among parties who had claim to a common object (i.e. stockholders, bondholders, managers, employees, suppliers, and customers). The bounds of the corporation were defined by the set of rights under the contracts". "These claimholders would make rational forecasts of the payoffs under their respective contracts and reflect these forecasts in their reservation prices".

Mayers and Smith acknowledged that whilst the specific demand for insurance by corporations might not be explained by the obvious reason for risk reduction, it could be justified by how this could affect the present value of the market price of the firm. This justification is consistent with the modern theory of finance. They argued that insurance purchases (risk management) by the firm would add value to the firm by ways of "...(i) allocating risk to firm's claimholders who have a comparative advantage to bear risk, (ii) lowering expected transactions costs of bankruptcy, (iii) providing real-service efficiencies in claims administration, (iv) monitoring the compliance of contractual provisions, (v) bonding the firm's real investment decisions, (vi) lowering the corporation's expected tax liability, and (vii) reducing regulatory constraint on firms" (Mayers and Smith, 1982, p.281).

For instance, Mayers and Smith argued that the firm's equityholders and debtholders have comparative advantage in risk bearing as compared to other claimholders because equityholders and debtholders have divisible claims which are traded in organized secondary markets. This has enabled equityholders and debtholders to diversity their risk in the capital markets. As a result, equityholders and debtholders bear the firm's risk at the lowest costs as compared to other claimholders. Mayers and Smith implied that if the equity and debt claims of the firm were large enough, the firm could simply shift risk to these two classes of firm's claimholders to provide an optimum level of risk for the firm. This will increase the value of the firm by way of favorably affecting the claimholders' forecasts in their reservation prices. But Mayers and Smith (1982) also pointed out that the shifting of risk to stockholders and bondholders is constrained by the firm's capital stock. Under this situation, insurance contracts would enable firm to conveniently shift risk to insurance company, resulting in "an efficient allocation of risk for the firm's other claimholders" (Mayers and Smith, 1982, p.281).[9]

Corporate purchase of insurance referred to by Mayers and Smith is a form of corporate risk management. It involves the transfer of risk to insurer. In the context of this thesis, the arguments for its efficacy can lend support to the concept of enterprise risk management (ERM), in the light of modern theory of finance such as the asset pricing model. The difference from insurance purchase of risk management is that ERM will retain the risk management function for risks that are not insurable, especially those of firm-specific risks, which exist in the firm.

Newer theory of corporate risk management began to look into frictional costs that are associated with corporate risk. For instance, "risk will tend to increase taxes and will increase the prospective costs of financial distress. Moreover, when a firm's cash flows are risky, conflicts of interest arise between shareholders and creditors. Unless constraints are imposed on managerial actions, this incentive conflict can lead to dysfunctional investment decisions" (Doherty, 2000a, p.9).

[9] Mayers and Smith assumed that "it is more expensive for the employees, suppliers, and customers to purchase insurance than for the firm. This occurs both because of economies of scale in contracting and because employees, customers, and suppliers are unlikely to have an 'insurable interest' in the firm (because of moral hazard, they are unlikely to be able to purchase insurance)".

2.5 EMPIRICAL RESEARCH IN ENTERPRISE RISK MANAGEMENT

2.5.1 Determinants of Traditional Risk Management

Due to a lack of academic literature regarding the determinants of enterprise risk management (ERM), Liebenberg and Hoyt (2003) looked to the literature that deals with determinants of traditional risk management activities such as hedging and corporate insurance demand. According to Liebenberg and Hoyt (2003), the demand for corporate insurance by firms with well-diversified shareholders is not driven by risk aversion. Since these shareholders are able to costlessly diversify idiosyncratic risk, insurance purchases at actuarially unfair rates reduce stockholder wealth. However, when viewed as part of the firm's financing policy, corporate insurance may increase firm value through its effect on reducing (i) agency cost, (ii) expected bankruptcy costs, (iii) the firm's tax liabilities, and (iv) the costs of regulatory scrutiny.

Corporate hedging, on the other hand, reduces expected bankruptcy costs by reducing the probability of financial distress. Hedging literature also suggest that this form of risk management potentially mitigates incentive conflicts, reduces expected taxes, and improves the firm's ability to take advantage of attractive investment opportunities (Smith and Stulz, 1985). However, according to Liebenberg and Hoyt (2003), the traditional risk management approach has been characterized as a highly disaggregated method of managing firm risk in which various categories of risk are managed in separate units within the firm.

As such, most empirical works on risk management research have evolved around the studies of the usage of derivative securities by firms. Derivative contracts are used as the proxy since their existence is only for risk management purpose.

Derivative products allow the firm's managers to avoid undesirable risks at a micro-level by transferring those risks to other participants in the derivative market who would like to bear them (Obaidullah, 2002). In this context, the trading volume of derivative products is used to measure the intensity of risk management activity in a firm. Most research involved the establishment of causal relationships between risk management activity and managers' motives for altering the distribution of future cash flow through the usage of derivative contracts (Cummins et al., 1998).

Research literatures on corporate risk management such as Miller and Modigliani (1961); Froot, Scharfstein and Stein (1993); Tufano (1996); MacMinn and Gaven (2000) have discussed the rationales for corporations to engage in risk management practice against their exposure to various risk factors. Studies in this particular area have cited that managers attempt to minimize the volatility of companies' cash flows because they are personally risk averse especially when managers' compensation is benchmarked against firms' performance, hence, the managerial risk-aversion hypothesis of risk management. Other literatures (e.g. Stulz, 1996; Cummins et al., 1998; Doherty, 2000a, b; Dionne and Garand, 2000) present the argument that managers engage in risk management to explicitly change the risk profiles of their firms so as to enhance the value of the firm's stocks, hence, the value-maximizing theories of risk management. However, the above justification for managers to engage in risk management activity does not run in tandem with the basic finance theory which postulates that, "absent friction in capital markets, shareholders can manage their own risk exposure" (Cummins et al., 1998, p. 30). The portfolio theory also advocates that it is cheaper for shareholders to minimize their risk exposure through diversification in their investment portfolio holding than for the firm to do it on shareholders' behalf. Cummins et al. (1998), thus, argue that the value-maximization rationale for risk management with derivatives entails "specific notion of important market imperfections" since employing derivative contracts comes at a cost.

2.5.2 Risk Management in Non-Financial Firms: The Determinants

Tufano (1996) highlighted that since the early 80s finance literature has presented discussions on the theoretical determinants of risk management, but very few have been featured on the effective measuring of the relevance of the various determinants that were being proposed. According to Tufano (1996), there are two classes of arguments presented to assert the reasons non-financial firms undertake risk management activities, namely (i) to maximize the firm's value, and (i) to protect risk-averse managers. Dionne and Garand (2000) pointed out that these two classes of argument were further developed in "the principal theoretical studies on the subject" by other studies such as Stulz (1996); Doherty (2000); Froot, Scharfstein and Stein (1993); Caillaud, Dionne and Julie (2000); and MacMinn and Gaven (2000). Tufano's (1996) empirical study on risk management practices in the gold mining industry revealed that the determinants for maximizing the firms' value were not significant whilst the managers' risk behavior related determinants were significant (Dionne and Garand, 2000).

According to Dionne and Garand (2000), literatures on risk management always cite four main determinants in justifying risk management activities: i) reducing the expected costs of financial distress; ii) reducing the risk premiums payable to various partners; iii) increasing investment possibilities; and iv) reducing expected tax payments. Dionne and Garand's (2000) replicated Tufano's (1996) study on risk management determinants affecting firms' values for the North American gold mining industry by updating the data base with the incorporation of the time-sensitive (or panel) aspect of the data. The results presented a new empirical results vis-à-vis that of Tufano (1996). The results indicated that many determinants related to maximization of the firms' value were statistically significant. For instance, variables related to tax and financial distress (or risk premium to stakeholders) were significant. On the contrary, determinants related to investment opportunity did not indicate significant effect. Dionne and Garand (2000) attributed this insignificant effect to the natural hedging argument as suggested by Froot, Scharfstein, and Stein (1993).

Dionne and Garand (2000) pointed out that there was hardly literature on risk management in non-financial firms which proposed adopting a portfolio approach of risk management. This apparent lack of study had not made it possible to offer a simultaneous observation on all available diversification possibilities for a firm to manage its overall portfolio, e.g. interest rates, foreign exchange rates, commodity prices. This lack of literature was due to the fact that there were limited proposed models which were able to measure potential correlation between the different sources of risks for firms. Furthermore, there are also lack of proposed models that featured the simultaneous implementation of various strategies to manage risks, e.g. purchase of insurance, hedging against currency exchange fluctuations, credit risk of partners (Dionne and Garand, 2000).

2.5.3 The Rise of Enterprise Risk Management

As a consequence to the frequent occurrence of corporate financial reporting scandals of late, enterprise risk management or *ERM* has emerged as a new paradigm for managing the portfolio of risks facing organizations. ERM seems to be able to stand up to the calls from the corporate world for a new mechanism which focuses on the improvement of corporate governance and risk management (Beasley et al., 2005). Specifically, enterprise stakeholders are expecting larger oversight on key risks facing the entity to ensure that stakeholder value is enhanced and well preserved (Walker et al., 2002). The design of ERM provides exactly such a mechanism in that it enhances the abilities of the board and senior management to oversee the portfolio of risks facing an enterprise (Beasley et al., 2005).

Numerous regulatory reforms globally contributed to the growth of ERM deployment. In the U.S. for example, the Sarbanes-Oxley Act of 2002 (SOX 2002) has significantly extending public policies related to effective corporate governance and risk management. The recent amendments in the New York Stock Exchange's (NYSE) Corporate Governance Rules saw the inclusion of specific requirements for NYSE registrant audit committees to shoulder explicit responsibilities with respect to "risk assessment and risk management". These responsibilities include the assessment and management of risks that are beyond financial reporting (NYSE, 2003; Beasley et al., 2005). Thus, a successful ERM deployment can serve as an effective corporate governance mechanism to pre-empt the ever-changing portfolio of risks facing the enterprise. In the absence of this kind of mechanism, stakeholder value is at risk. From the regulatory standpoint, this can potentially result in major public policy concerns if it is no tackled properly and with urgency (Beasley et al., 2005).

In respond to the new regulatory requirements for enterprise risk management, the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in September 2004 issued *Enterprise Risk Management-Integrated Framework*, to provide a model framework for ERM. The COSO's framework defines ERM as follows:

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

Many organizations are deploying ERM processes to enhance the efficacy of their risk management initiatives, with the ultimate objective to increase stakeholder value (Beasley et al., 2005). In this respect, ERM is able to deliver a significant input of competitive advantage for organizations which can demonstrate a strong ERM capability and discipline (Stoh, 2005).

Despite the rise and increased acceptance of ERM however, not all organizations are adopting it. There is little insight as to why some organizations embrace ERM while others do not. There is also little academic research on the efficacy, impact, and factors associated with the implementation of ERM.

2.5.4 Factors Associated with ERM Implementation

Two recent academic studies looked into the adoption status of ERM. Kleffner et al. (2003) examined the characteristics of Canadian companies and their ERM adoption status. The study revealed that companies adopting ERM cited the following determinants (with respond frequency in bracket) as the key factors causing their adoption of ERM: "the influence of the risk manager (61%)", "encouragement from the board of director (51%)", and "compliance with Toronto Stock Exchange (TSE) guidelines (37%)". Liebenberg and Hoyt (2003) on the other hand gauged the appointments of Chief Risk Officer to investigate the determinants of ERM adoption. The study found that companies appointing a Chief Risk Officer had higher leverage.

A global survey of insurance executives found that enterprise-level risk management has caught the attention of insurers and was given high-level accountability as well as clear responsibilities (Tillinghast-Towers Perrin, 2004).

An empirical study by Beasley, Clune, and Hermanson (2005) looked into factors associated with the stages of ERM implementation at a variety of US and international organizations. Based on the data collected from 123 organizations, Beasley et al. (2005) found that the stages of ERM implementation were positively related to the presence of: (i) a chief risk officer, (ii) board independence, (iii) the apparent support for ERM from the CEO and CFO, (iv) the presence of a Big Four auditor, (v) entity size, and (vi) entities in the banking, education, and insurance industries. Furthermore, Beasley et al. (2005) also found that US organizations to have less-developed ERM processes than their international counterparts.

2.5.5 *Financial Crises and ERM Implementation by Malaysian PLCs*

The East Asian financial crisis in 1997 and the 2008 global financial meltdown as a result of US sub-prime mortgage crisis have had profound impact on the earnings of Malaysian companies. For instance, it has been reported that in the aftermath of the 1997 and 2008 crises, the Malaysian stock market had experienced a drop of about 45% of its market value (measured through its barometer Kuala Lumpur Composite Index, KLCI) (Angabini & Wasiuzaman, 2010). The drop in the market value could be a manifestation of the material direct impact from the crises on companies' earnings or a knee-jerk reaction of the lost of confidence on the future prospect of companies' earning due to informational asymmetries. The latter phenomenon (informational asymmetries) was evident for the 2008 crisis as things were quickly settling down after the market realized that the situation was not as severe for the Malaysian market as it was initially anticipated. The market rebounded strongly in 2010 and the better-than-expected situation was mainly due to some good precautionary measures being put in place by the regulators to safeguard market stability after learning from the bad experience in the 1997 crisis.

Majority of Malaysian public listed companies did not encounter much problem either in terms of liquidity or earnings capacity during the 2008 crisis. Compared to the 1997 Asian financial crisis, this time around most of the companies had already put in place some form of enterprise risk management (ERM) mechanism within their operating structure, courtesy to the learning curve obtained from the awful experience in 1997. Even if some companies initially faced a few problems, they rebound strongly and quickly thanks to their ERM program implemented.

The experience during the 2008 crisis has somewhat attested the efficacy of ERM program. As firms can expect more challenges ahead in their business dealings, they should see the importance of instituting a formal ERM program within their operating structure to cope with future challenges.

2.6 VALUE PROPOSITIONS FOR CORPORATE / ENTERPRISE RISK MANAGEMENT

As discussed earlier that Dionne and Garand (2000) identified two classes of argument in the principal theoretical studies (e.g. Tufano, 1996) on the determinants for firms (non-financial enterprises) to undertake risk management activities. These two classes of argument are (i) to maximize firm value, and (ii) to protect risk-averse managers.

Many literature such as those of Doherty (2000b); Stulz (1996); and Froot et al. (1993) have cited the following principal determinants derived from the two classes of argument for firms to engage in risk management, namely (i) reducing cost of financial distress, (ii) lowering risk premium, (iii) lowering tax burden, (iv) avoiding costly external financing, (v) reducing informational asymmetry, (vi) firms' capital structure, (vii) increasing investment possibilities, (viii) agency problem, and (ix) managers' risk-averseness. This thesis provides further review on these principal theoretical determinants which lead to the proposed value creating enterprise risk management arguments as follows:

2.6.1 Reducing Cost of Financial Distress

Studies such as Dionne and Garand (2000); Stulz (1996) have also provided evidences that are consistent with value-maximization theories of risk management. These studies investigate the primary rationales for risk management. One primary rationale is to mitigate the costs of financial distress. There are evidences to support the hypothesis that firms engage in risk management if they are more likely to incur financial distress costs. For example, a study by Wall and Pringle (1989) provided evidence that firms with lower credit ratings are more likely than those with higher rating to use derivative contracts such as swaps for risk management. However, Cummins et al. (1998) indicated that the evidence is not persuasive for non-financial companies. This argument is refuted by Dionne and Garand (2000) with their empirical study in the gold mining industry. The study provided yet another evidence to indicate that the cost of financial distress is high for firms with heavy debts as well as with stakeholders who are risk averse.

2.6.2 Lowering Firms' Risk Premium

Dionne and Garand (2000) also highlighted that two principal determinants for corporate risk management, namely financial distress costs and risk premium, were always bundled together for analysis in study since there were no variables capable of differentiating between them. As such, the two determinants demonstrated similar effect on corporate risk management. Dionne and Garand (2000) pointed out that firms with high expected financial distress costs and those with high risk premium to pay to their various creditors and business partners were more strongly motivated to engage in risk management in order to hedge their risks to reduce these two costs, i.e. financial distress cost and risk premium, and hence increase the firm's net value.

Dionne and Garand (2000) employed four variables to measure these costs. They are direct and indirect operating costs, long-term debt weighted according to market value, payment of dividends, and use of preferred shares. The former two have positive association with the firm's financial distress costs whilst the latter two have negative association with financial distress cost which measure the firm's financing possibilities other than debt instruments. Dionne and Garand (2000) concluded that firms with high production costs are less efficient, hence more prone to financial failure. Thus, these firms would soon find themselves in financial difficulty. As a result, they would pay higher premiums to their various business partners.

2.6.3 Lowering Tax Burdens

Another primary rationale for the firm to engage in risk management activity is that of reducing expected tax burdens. Evidence on taking position in derivative contracting as the risk management tool to reduce company's expected tax liabilities is more convincing (Cummins et al, 1998). Empirical study by Nance, Smith, and Smithson (1993) reports non-financial companies with higher investment tax credits are more prompt to transact in derivative markets. Cummins, Phillips, and Smith (1997b) also lend evidence to support the tax hypothesis that taxes are a significant determinant for companies to engage in derivative transactions. Furthermore, risk management through hedging enables firms to reduce fluctuation in their earnings. If firms are having a convex tax structure, this may cut their average taxes (Dionne and Garand, 2000). This tax structure convexity argument is derived from the nature of governments' asymmetrical methods of taxation (Dionne ad Garand, 2000; Doherty, 2000b; Graham and Smith, 1999). The empirical study by Dionne and Garand (2000) indicated that risk management through hedging reduced taxable income volatility within the range of 5% whilst the mean of the tax save variable was about 5%.

2.6.4 Avoiding Costly External Financing

Numerous studies have lend strong evidence that firms engage in risk management, primarily using derivatives as the tool, to ensure the stability of internal funding mechanism through the reduction of income stream variation. This is to ensure that firms have sufficient internal fund to undertake attractive and positive yielding projects. Internal funding is preferred over the external ones because the former is cheaper. These findings are consistent with the costly external finance hypothesis which postulates that managers persistently trying to alleviate the need to source costly external funds for taking advantage of investing in profitable projects. For instance, Gay and Nam (1997) document evidence that non-financial firms with low levels of liquidity and high growth opportunities, as measured by the ratio of the market value to the replacement value of the firm, tend to hedge more with derivatives. Geczy, Minton, and Schrand (1977) and Nance, Smith, and Smithson (1993) deliver similar findings. Both studies find that less liquid non-financial firms are more likely to use derivative to prevent situations in which firm may force to forgo valuable projects due to a shock to the internal capital resources. A study by Ahmed, Beatty, and Takeda (1997) on 152 U.S. commercial banks reports that banks with less liquidity tend to hedge their exposure to various price risks by using derivatives. Studies by Cummins, Phillips, and Smith (1997a, 1997b) on insurers find that firms with large portion of illiquid assets tend to mitigate the volatility of their income stream with derivatives.

2.6.5 Reducing Informational Asymmetry

However, not all risk management undertaken by managers only serves the narrow interest of managers themselves. Risk management is justifiable if it will enhance enterprise value. Cummins et al (1998) put forth two generic rationales which argue that there may be in shareholders' interest for certain types of enterprises to manage risk. The first rationale is that there may be some risks that are not tradable and the second rationale is that there exists situation in which there are informational differences among owners and managers. The existence of non-tradable risk limits the degree of homemade diversification that shareholders can do for themselves (Smith and Stulz, 1985) whilst informational differences can lead to undervaluation of firms (Froot, Scharfstein, and Stein, 1993), which is obviously not in the interest of the corporation's shareholders (Cummins et al, 1998).

One of the examples of non-informational frictions that prompt for value-related motive of risk management by managers is the existence of fixed costs, especially those that are related to the use of derivative instruments during the risk management process which require large up-front costs. Another example is that of costs on the firm that are associated with financial distress or bankruptcy. Examples of these costs are both the direct legal and regulatory costs of bankruptcy as well as the indirect cost costs resulting from deteriorating relationships with key employees, suppliers, or customers. Even in the case where bankruptcy is not the ultimate outcome, the indirect costs related to financial distress faced by a firm can have an adverse impact on the firm's cash flow (Brennan and Schwartz, 1988). Due to this dynamism, shareholders would rationally be supportive of hedging profits in an effort to protect themselves from incurring these costs (Cummins et al., 1998; Smith and Stulz, 1985).

On the informational friction front, Froot, Scharfstin, and Stein (1993) argue that if there is asymmetric information between managers and potential outside investors, this will result in even a fundamentally sound firm, when facing temporary distress, will find raising the needed funds in the capital market to be either not easily available or too costly, i.e. firm will have to sell securities to outsiders at a discount, which is less than the full-information value of the claims on the firm. As such, by engaging in risk management activity to hedge against the fluctuation in the firm's cash flow, such as by entering into futures or forward contracts, these firms can avoid having to go to capital markets to source funds during the time of temporarily financial distress (Cummins et al, 1998).

2.6.6 Firms' Capital Structure

The link between a firm's capital structure and risk management activity has attracted numerous studies. Conceptually, it is believed that a firm with higher debt ratio structure will increase the likelihood of financial distress. For example, if a firm uses more debt instruments over equity in its balance sheet, it is said to be highly leveraged. Hence, the firm assumes more risk for the shareholders since the financial obligation on these debt instruments is contractual. In this regard, many studies investigate whether a firm's likelihood to engage in risk management via derivatives contracting is a function of the firm's capital structure. Mian (1996), Nance, Smith, and Smithson (1993) do not find evidence to suggest that derivatives trading is highly linked to a firm's capital structure. Minton, and Schrand (1997) take a step further by examining the relationship between capital structure and the decision to manage foreign currency exposure by recognizing the simultaneous nature of managers making capital structure and risk management decision for their firms. Minton and Schrand incorporate the joint decision making process of managers in their estimation procedure. Result of the study shows no relationship between capital structure and the decision to use derivatives.

Studies on decision by financial companies to use derivatives in managing risk of financial distress have delivered mixed results. Study by Sinkey and Carter (1994) provide only mild evidence suggesting the relationship between risk management activity and capital structure of U.S. commercial banks. Similarly, Gunther and Siems (1995) show no significant link between the usage of derivatives and the capital structure of the firm. Further more, when probing further on those banks that recorded higher volume on derivative trading, Gunther and Siems find out those banks to have higher capital ratios. This result seems to be not in tandem with the financial distress hypothesis. Cummins, Phillips, and Smith (1997b), however, reveal a result in support of financial distress hypothesis which show a significant and negative relationship between capitalization level of insurance companies with the engagement in using derivative products.

A study on non-financial firm regarding the capital structure-risk management link conducted by Dolde (1996), however, reports a significant complementary relationship between the two variables. In the study, Dolde applies a control on the firm's underlying exposure to various financial risks.

2.6.7 Increasing Investment

It is crucial for firms to ensure stable and ample internal earnings so that there is no need to seek external financing to fund investment projects. According to Froot, Scharfstein, and Stein (1993), external funding is a more expensive funding method since entrepreneurs (borrowers) and investors (lenders) are in an asymmetrical information position in regard to the quality of investment projects to be financed. As such, firms should hedge risks to strive to reduce the fluctuations of internal earnings. This can avoid in missed opportunities for good investment projects or having to fund investment projects with costly external financing. This argument is especially true during the period of low internal earnings.

Dionne and Garand (2000) observed a positive relationship between investment opportunities and hedging of risks. Dionne and Garand (2000) employed two variables: exploration (in gold mining industry) and acquisitions to measure investment opportunities. Nonetheless, Dionne and Garand (2000) cautioned that this relationship could be very weak and even negative in the case where the values of investment opportunities are themselves random. For example, when there is occurrence of natural diversification within the firm, and if this natural diversification is positively linked to investment opportunities and the source of internal financing, then the need for hedging will be much less.

2.6.8 Agency Problem

The rationale and justification for risk management in corporations have always been a contentious issue. As Cummins (1998) had rightly indicated, farmers for example, who may engage in risk management by participating in futures or forward commodity markets before harvest time to hedge against the price volatility of their anticipated crop and a firm with large number of shareholders, which is facing the same commodity risk as the farmers, may not take costly market position to manage risk as it may be cheaper for the shareholders to reduce or eliminate the risk by diversifying their portfolio holding instead (Cummins et al., 1998). This argument is supported by the two studies by Modigliani and Miller (1958; Miller and Modigliani 1961) which said that any effort undertaken by managers in changing the risk profile of the firm's cash flow could not benefit their shareholders in a world with no transactions costs or taxes. In the situation postulated by Miller and Modigliani, shareholders would be able to do at no costs what managers would do to maximize shareholders' value. Although Miller and Modigliani's studies on changing the firm's risk profile through the use of debt instruments or the arrangement of dividends distribution instead of using financial derivative securities, argument on the essence of who should manage risk is the same regardless of the methods and instruments used (Cummins et al., 1998).

2.6.9 Managers' Risk Averseness

As such, the question arises as to why managers of widely held corporation, who are supposed to act in the interest of their stockholders, should bother to manage risk since their shareholders could presumably do so and at lower cost at their personal portfolio holding level. Cummins et al. (1998) highlight the motives for such an effort in one of these two areas: "either there are some risks that shareholders cannot manage for themselves as inexpensively" or "managers are acting in their own interest, rather than those of the stockholders of the firm". Cummins et al. further argue that managers have an economic incentive to ensure the firm continues to do well in that they have disproportionately large investments in the forms of their skills or human capital in the firm. It is costly to transfer these skills should they need to seek other works. As such, managers concern about any negative shocks to profits that might result in putting the firm into financial distress or the edge of bankruptcy. Bankruptcy and times of financial distress often lead to the replacement of current management. This poses a huge personal risk that cannot be easily diversified like what shareholders can.

Tufano (1996) investigates managerial motives for risk management by looking into managerial compensation schemes and hedge ratios in the gold mining industry. Tufano argues that risk-averse managers whose compensation comes in large part through acquiring shares in the firm will be motivated to engage in risk management to safeguard their interest by securing the firms' cash flow. In contrast, managers who earn a relatively large portion of their compensation through the granting of stock options would have higher tolerance on risk since they could simply not exercise the options should the firm underperform whilst on the other hand, they could capitalize the high payoffs offered by their positions should the firm do well. Results of Tufano's study are in line with the risk aversion hypothesis of risk management. Two salient points have been highlighted by Tufano's study. Firstly, the interest of shareholders will not be enhanced as there is almost no evidence to support the various rationales that would make risk management a value-maximizing decision. Secondly, the study reveals that risk management activity is much less in the firms that have large cash balances.

Traditional finance theory like the one postulated by Sharpe (1964), however, highlighted that shareholders are not always agreeable with the managers' line of thinking about risk management. Stockholders would not share management's dismay about financial distress or even the failure of one particular corporation. It is only about systematic risk of the portfolio holding, or the portion of risk that cannot be diversified away by spreading out their investment across firms with various types of businesses, that shareholders are concern about. Stockholders therefore, would not be inclined to support actions by management that reduce risk that is viewed as diversifiable (Cummins et al, 1998). The conflict of interest between managers and shareholders in the need for risk management in this respect reflects a typical scenario of agency problem.

2.7 MANAGING RISK INDIVIDUALLY VIS-À-VIS INTEGRATED APPROACH

Meagher and O'Neil (2000) pointed out that the current risk management approaches are fragmented, treating risks as disparate and easily compartmentalized. Bierc (2003) supported this argument by saying that risk is typically viewed as something to be avoided or mitigated – and to be separated, categorized and addressed in silo. Bierc (2003) continued to argue that risk management has often been practiced to merely comply with the many new rules and regulations, which has failed to add any sustainable value. To meet the needs of future business, according to Meagher and O'Neil (2000), risk management process should be one that improves the linkage of risk and opportunity and to position it as a source of competitive advantage. The process should seek a wider concept and understanding of risks that present themselves within the setting of an organization. The undertaking of these risks then should be lined up with corporate strategies, objectives, and goals (IAAS, 2008).

In addition, the risk management approach should be positive and proactive, value-based and broadly focused, embedded in processes, integrated in strategy and total operations, and continuous. On the other hand, Miller (1992) cautioned that corporate risk management is not limited to the assessment of exposure to losses and application of appropriate financial risk management practices. He pointed out that financial and strategic responses are interrelated in such a way that decision making in either area to the exclusion of the other would be suboptimal.

2.8 ENTERPRISE RISK MANAGEMENT (ERM): THE OPERATIONAL DEFINITION

Chapman (2003) defined ERM as the process of identifying and analyzing risk from an integrated, company-wide perspective. Meagher and O'Neil (2000) on the other hand, described enterprise-wide risk management (EWRM) as a structured and disciplined approach in aligning strategy, processes, people, technology and knowledge with the purpose of evaluating and managing the uncertainties the enterprise faces as it creates value. Stoke (2004) viewed enterprise-wide risk management (ERM) to be an essential element of modern business as the focus for corporate risk management is shifting from operational hazards and pure financial risks to a much more strategic view of threats to business success and an appetite for upside risk. Stoke added that by combining this with a more holistic, top-down approach to risk strategy and appetite, companies can focus their attention on most significant threats to business objectives and achieve even greater value from risk management. Liebenberg and Hoyt (2003) concurred that unlike the traditional "silo-based" approach to corporate risk management, ERM enables firms to benefit from an integrated approach in managing risk that shifts the focus of risk management function from primarily defensive to increasingly offensive and strategic.

In a nutshell, the concept of ERM entails a paradigm shift which dictates that the focus of risk management has to be shifted from the conventional operational hazards and pure financial risks to a much more strategic view of threats to business success. A robust and dynamic risk management framework should also promote an appetite for upside risk. The framework for business risk management process traditionally will not run away from the following basic steps: evaluating, identifying, measuring, treating, and monitoring risk. The Committee of Sponsoring Organizations of the Treadway Commission's (COSO) ERM's model consists of 8 components: internal environment, objective setting, event identification, risk assessment, risk response, control activities, information and communication, and monitoring (COSO, 2004; Chapman, 2003). In comparison, the Arthur Andersen Business Risk Management Process (BRMP) develops a risk management framework that comprises 7 elements: (i) establish the business risk management process, (ii) assess business risks, (iii) develop business risk management strategies, (iv) design/implement risk management capabilities, (v) monitor risk management performance, (vi) continuously improve risk management capabilities, (vii) information for decision making (Meagher and O'Neil, 2000).

To ensure successful enterprise-wide risk management process implementation, Meagher and O'Neil (2000) emphasized the following 4 dimensions: (i) moving away from fragmented approach, towards an integrated and systematic framework that gives credibility to the risk management role within the business; (ii) identifying risk management goals and linking them to enterprise's strategies; (iii) delegating responsibility for risks and making managers accountable to the board for continuously improving the management of those risks; (iv) do not only manage individual risks, but be able to systematically pool them and assess risk as a portfolio for the enterprise as a whole.

In comparison to the old silo-approach of risk management, ERM proponents argue that an integrated approach of risk management increases firm value by reducing inefficiencies inherent in the traditional approach, improving capital efficiency, stabilizing earnings, and reducing the expected costs of external capital and regulatory scrutiny (Liebenberg and Hoyt 2003). Bierc (2003) introduced the concept of strategy risk management (SRM). According to Bierc, SRM should be developed and pursued with substantial regard to the key drivers that would impact success and value of a corporation. It should keep an organization focused on the things that drive success, providing tools that effectively measure "execution".

An ERM initiative typically includes the following activities: (i) articulating and communicating the objectives of the organization, (ii) determining the risk appetite of the organization, (iii) establishing an appropriate internal environment, including a risk management framework, (iv) identifying potential threats to the achievement of the objectives, (v) assessing the risk i.e. the impact and likelihood of the threat occurring, (vi) selecting and implementing responses to the risks, (vii) undertaking control and other response activities, (viii) communicating information on risks in a consistent manner at all levels in the organization, (ix) centrally monitoring and coordinating the risk management processes and the outcomes, (x) providing assurance on the effectiveness with which risks are managed.

The above activities of an ERM program is well represented by a schematic diagram which is sampled from a public listed firm on the Bursa Malaysia as in Figure 2.1 below:

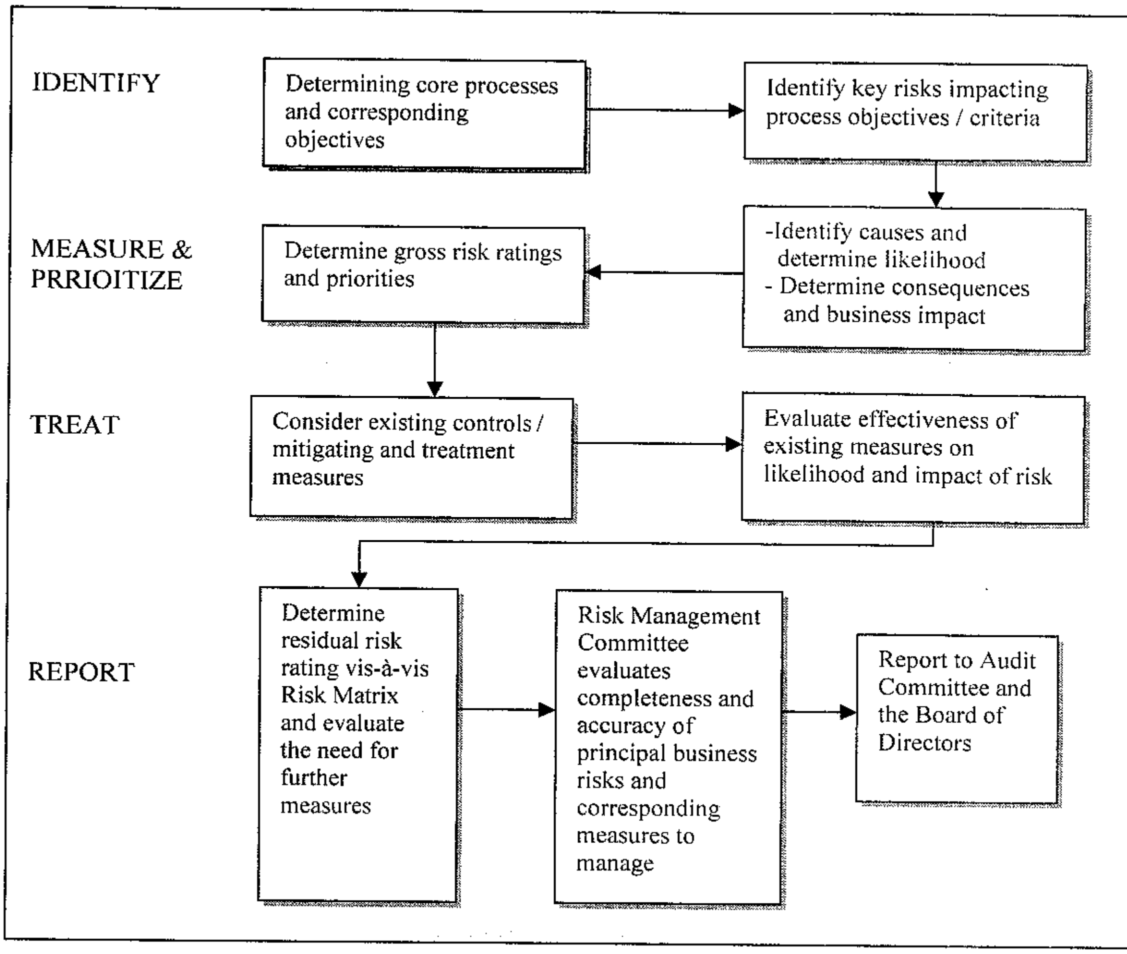

Figure 2.1: Enterprise Risk Management Framework
Source: Tanjung Public Limited Company Risk Management Process
http://www.tanjongplc.com/flashSite/CorporateInfo/systemControl.asp
[29 April 2008]

2.9 ENTERPRISE RISK MANAGEMENT: THE THEORETICAL FOUNDATIONS

Earlier in the chapter, it has been presented clearly on the contradictory argument between classic finance theory (CFT), neo-classical financial theory (NCFT) i.e. Modern Portfolio Theory (MPT) and Capital Asset Pricing Model (CAPM), and risk management value-maximization theory on the efficacy of corporate (financial) risk management. Note that the efficient frontier and CAPM are elements of Modern Portfolio Theory and the latter is a part of neo-classical financial theory (Belmont, 2004). In this section, this thesis will provide a discussion on the consolidated view of all arguments that will lead to a new perspective of corporate risk management and hence, the development of the research model for the study.

To provide an overview, CFT advocates two primary risk management tools for investors in their wealth investment, namely, (i) diversification[10] and (ii) asset allocation[11]. These two concepts of investors' risk management tools were first studied and popularized by Harry Markowitz (Belmont, 2004). Harry Markowitz in 1952 extended his work by introducing a Model of Portfolio Theory. He theorized a relationship between risk and return. Markowitz's model of portfolio theory emphasizes on risk return trade-off in terms of mean-variance efficient portfolio, hence the introduction of the *Efficient Frontier* of various assets combination and weight. An efficient frontier of an investment domain (Figure 2.2) represents a set of "efficient portfolios" that maximize expected returns at a given level of portfolio risk, or that minimize portfolio risk for a given expected return (Belmont, 2004).

However, Markowitz (1952) posited that there are as many efficient portfolios that lie on the efficient frontier as there are investor risk preferences. Nonetheless, by referring to this efficient frontier and based on their risk preferences, investors can construct risk-return efficient portfolios that offer them the optimal return (Belmont, 2004); that is, a diversified portfolio of securities that

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[10] Diversification of portfolio means the exercise of distributing portfolio holding across a greater number of assets (i.e. to include more than one asset type in the investment holding such as combining stocks, bonds, money market instruments, commodities, real estate and etc in order to reduce exposure to risk).

[11] Asset allocation, on the other hand, entails the decision of determining the amount of wealth being invested across asset classes.

provide investors with the highest level of return for a given level of risk (Chatterjee et al., 1999). Essentially, Markowitz's model of portfolio theory also stipulates that investors can only get a higher return by accepting a higher level of risk along the "efficient frontier" (Chatterjee et al., 1999).

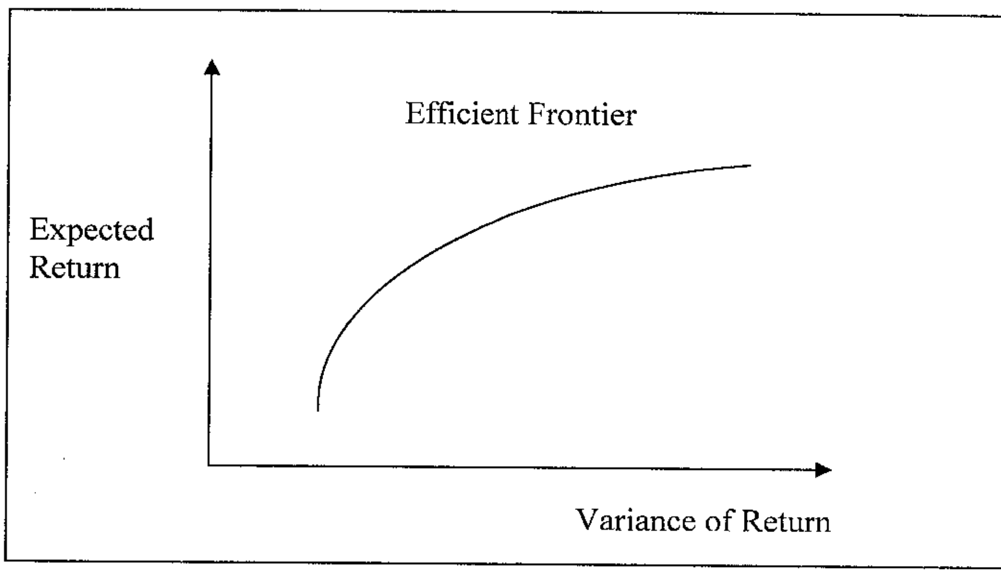

Figure 2.2: The Efficient Frontier
Source: Belmont (2004), p.22.

Applying these two powerful options of diversification and asset allocation advocated by the CFT, the NCFT (i.e. Modern Portfolio Theory and CAPM) on the other hand, postulates that any internal risk management effort undertaken by the firm to reduce its firm-specific risk will be of no value to shareholders because shareholders can easily employ the above two risk management options, and arguably at a cheaper cost, to attain the same purpose and effect through building an investment portfolios. This argument holds true unless firm-specific risk management can prove to result in the increase of the present value of the firm's cash flow. As such, internal risk management by the firm should focus only on reducing its systematic risk by such ways of hedging or buying insurance (Belmont, 2004). This conclusion of NCFT somehow runs counter to the initial value proposition of corporate risk management by the CFT. For instance, Markowitz's model of portfolio theory would suggest that if managers could find ways to minimize the firm's cash flows volatility, or "total risk"[12], then they could create value for shareholders as long as the stabilized cash flows would not come at the expense of their expected value. NCFT such as CAPM, which extended Markowitz's portfolio theory, demonstrated that in equilibrium, the "market portfolio" is the only one efficient portfolio that applies to all investors, regardless of their risk preferences. Hence, therein gives rise to the notion of beta. Thus, according to CAPM, beta risk is the only risk that investors should be concerned about in equilibrium (Chatterjee et al., 1999).

Notwithstanding so, it is worth noting that according to another school of thought, i.e. the classic efficient market theory, even the management of systematic risk is futile. This is because it will not add value to shareholders since the costs of such activities like hedging and buying insurance policies will completely offset the value of eliminating such systematic risk. Hence a zero sum game ensued for shareholders (Belmont, 2004; Doherty, 2000a).

[12] "Total risk is defined as the standard deviation in a firm's returns over some specifies time period-say, 150 trading days" (Chatterjee et al., 1999:564). In the concept of portfolio risk, total risk is the sum of systematic (market) risk and unsystematic (firm-specific) risk.

2.9.1 CAPM: Systematic risk versus Unsystematic risk

Treynor (1961), Sharpe (1964) and Lintner (1965) introduced Capital Asset Pricing Model (CAPM) by using the concepts of diversification and asset allocation, coupled with the modern portfolio theory as building blocks (Belmont, 2004; Bettis, 1983). Variables that are involved in CAPM's formulation are systematic risk, specific risk (unsystematic risk), beta, and risk premium. Core to CAPM's notion is the division a security's total risk into two parts, namely the systematic risk (also called market risk) and the unsystematic risk (also called firm-specific or unique risk). CAPM explains systematic risk as the component of an asset's price variance that is affected by the movement of the general market. It is also referred to as market risk. The covariance of the market and the asset's price movements is measured by a coefficient called Beta (β). Thus, systematic risk is the risk of holding the market portfolio (Belmont, 2004).

Specific risk of an asset, on the other hand, is the other component of the asset's price variance that is unique to itself and has no correlation to the general market movement. This element of specific risk can be eliminated through diversification within an asset class. Systematic risk, however, cannot be diversified away. Nevertheless, it can be hedged. According to CAPM, the marketplace is efficient and compensates investors for taking systematic risk. Exposure to specific risk (idiosyncratic risk) will not be compensated because CAPM expects investors to diversify that risk away without reducing returns and at no cost in their portfolios' asset class (Belmont, 2004). The expected return of an asset (portfolio) under CAPM is given by:

$$E(R_i) = R_f + \beta^m{}_i \,[\, E(R_m) - R_f \,]$$

where $E(R_i)$ is the expected return on $asset_i$; R_f is the return on a risk-free asset; $\beta^m{}_i$ measures the covariance of $asset_i$'s return to that of the market; $E(R_m)$ is the expected return on the market. Since β (beta) measures the sensitivity of an investment's return to movements of the entire market, stocks with a beta of less than 1 will be less risky than the market whilst those with a beta greater than 1 will be more risky than the market (Bettis, 1983). In the CAPM formula term, the product of $\beta^m{}_i\ [\ E(R_m) - R_f\ ]$ represents risk premium for stock i. In other words, it is the compensation for the stock's exposure to the systematic risk.

CAPM's assumptions are:

- There are no taxes or transaction costs.
- All investors have identical investment horizons.
- All investors have identical perceptions regarding the expected returns, volatilities and correlations of available risky investments.

In the context of NCFT's uniform assumptions of such a simple world (i.e. perfect[13] and complete markets[14]), Tobin's (1958) saw a super-efficient portfolio as represented by the market portfolio (Tobin quoted by Belmont, 2004). Bettis (1983) pointed out that although CAPM's formulation is explained in terms of stock returns, it has a parallel implication in capital budgeting situations where:

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[13] Financial markets are perfect if: (1) there are no differences in information across investors (i.e. markets are informationally efficient and information is simultaneously and fully available to all market players). (2) there are no taxes. (Belmont, 2004: 26)

[14] A market is complete if: (1) all streams of cash flows can be traded irrespective of amount, time, structure, and risk profile. (2) a risk-free asset exists whose interest rate is the same for all market participants irrespective of lending or borrowing. (3) costless and complete information leads to homogenous expectations and to the absence of arbitrage opportunities. (Belmont, 2004:26)

$r = r_f + (\text{project beta})\ (r_m - r_f)$, and

r = required rate of return on the project.

Hence, the required rate of return on a project increases in tandem with the project's beta. It then follows that the true cost of capital is influenced by the risk profile of the project for which the capital is put to use (Bettis, 1983).

2.9.2 Recent Challenges to CAPM

Lusk, Halperin & Bern (2008), Guo (2004) and Chatterjee, Lutbakin & Schulze (1999) highlighted that CAPM's theoretical veracity has been questioned by many scholars owing to its simplifying assumptions which do not conform to reality. For instance, Chatterjee et al. (1999) cited examples such as Kadlec & McConnel (1994), Levy (1978) and Merton (1987) who doubted that investors are fully diversified as assumed by CAPM; Roll and Ross (1994) who claimed the impossibility to construct a fully diversified portfolio; Teece (1984) who referred to CAPM's static equilibrium as a "fictitious state"; Grossman & Stiglitz (1980), Stein (1988, 1989) who rejected CAPM's perfect market assumption from economic of information point of view on the premise of information asymmetries that exist in the markets; Arrow (1974) who stressed that the reason why markets fail and organizations are formed is because markets do not distribute information thoroughly, albeit efficiently. Due to these asymmetries, Chatterjee et al. (1999) noted that it has created principal-agent problems which prompted agency theorists championing the setting up of a proper governance mechanism within corporate structure.

Besides, CAPM's predictive validity has also been challenged (Lusk et al., 2008; Guo, 2004). Fama & French (2004) and Chatterjee et al. (1999) cited examples of Reinganum (1981); Lakonishok and Shapiro (1986); Merton (1987); Bhandari (1988); Chan, Hamao and Lakonishok (1991), who doubted the predictive ability of beta. These authors provided empirical evidence which indicated that investors were concerned with more than just beta. In addition, Chatterjee et al. (1999) also highlighted other studies which suggested that the predictive power of non-market (firm-specific) factors are better than beta alone when it comes to predicting stock returns. For instance, Chatterjee et al. (1999, p.557) cited Levy (1978) who found that "a firm's unsystematic risk is a key predictor" to stock returns; Basu (1983) who found that "the earnings-to-price ratio explains stock returns at least as well as beta"; Merton (1987) who found that "both beta and firm-specific risk are important predictors". On the other hand, other researchers such as Bhandari (1998) also found that leverage is just as important in predicting stock returns. Whilst Brown, Harlow and Tinic (1993) found the same effect for total variance in a firm's stock returns (Chatterjee et al., 1999).

Evidence from some strategy studies also challenges beta's "predictive validity" (Chatterjee et al., 1999, p.557). For example, Amit and Wernerfelt (1990) highlighted the material impact of firm-specific risk by noting an inverse relationship between a firm's market value and its level of unsystematic risk. Miller and Bromiley (1990), Cannella and Lubatkin (1993), Lubatkin and Chatterjee (1994), on the other hand, found a significant correlation ($p \leq .001$) between beta and unsystematic risk at .43, .32, and .31 respectively (Chatterjee et al., 1999). The two terms were estimated from the market model. Chatterjee et al. argued that the two risks should be uncorrelated since they are randomly distributed across firms. The significant correlation indicates that the two terms have "an overlapping component that is omitted from the model" (Chatterjee et al., 1999, p.557).

Chatterjee et al. (1999, p.557) described Fama (1991, 1997) and Fama and French (1992, 1993, 1995, 1996) as an "arguably the most prominent challenge to the predictive validity of beta". Fama and French (2004, p. 43) described the version of CAPM developed by Sharpe (1964) and Lintner (1965) as "has never been an empirical success". Fama and French (2004) cited the following reasons as to why CAPM has failed empirically. Firstly, it is due to investors' irrational pricing of stocks in terms of book-to-market ratios for sorting growth and distressed firms. Secondly, the failure is caused by the oversight of the model itself in capturing some other important dimensions of risk (i.e. the covariance of investors' portfolio return with labor income and future investment opportunities). Moreover, Fama and French (2004, p. 41) also noted that researchers have a problem to find reasonable proxies for market portfolio. They noted that the model's stipulation for market portfolio is "theoretically and empirically elusive". As they put it: "it is not theoretically clear which assets (for example, human capital) can legitimately be excluded from the market portfolio, and data availability substantially limits the assets that are included".

Thus, Fama and French concluded that market model is not effective in predicting stock returns, but is able to explain the majority of its variation. However, these authors found that the market model's accuracy could be markedly strengthened by adding two firm-specific factors, namely, firm size (market capitalization) and book-to-market value (i.e. higher average returns on small stocks and high book-to-market stocks) (Fama & French, 2004; Chatterjee et al., 1999). They argued that although these two variables are not themselves state variables, "they reflect unidentified state variables that produce undiversifiable risks (covariances) in returns that are not captured by the market return and are priced separately from market betas" (Fama & French, 2004, p.38).

In conclusion, in determining a firm's risk premium, investors are concerned with more than just the covariance of the firm's earnings with that of market portfolio, or beta. Other state variables (i.e. inflation) as previously cited and firm-specific elements are just as relevant and important in deciding a firm's share prices and in estimating long-term returns (Fama & French, 2004; Chatterjee et al., 1999; Barber & Lyon, 1997). The growing recognition of firm-specific measures in asset pricing, nonetheless, has posed "a challenge to CAPM because of their theoretical nature" (Chatterjee et al., 1999, p. 558). Fama and French label these measures as "empirical anomalies" because they are not given any "special standing in asset-pricing theory" (Fama & French quoted by Chatterjee et al., 1999, p.558). Notwithstanding so, these measures are given due recognition by authors like Fama, French, Lakonishok, Haugen, DeBondt, and others in estimating a firm's risk premium (Fama & French, 2004; Chatterjee et al., 1999). Despite all these, Chatterjee et al. (1999) reckoned that the use of firm-specific measures like firm size and book-to-market value is rather "coarse grained" and justifications to include the measures into a model of asset pricing are "too theoretically thin" to satisfactorily tackle the "what and why questions".[15] Nonetheless, recent study by Drew,

[15] Chatterjee et al. cited Ravenscraft (1983) in suggesting that theory supports size for a firm's structure advantage, thus attributing it to expected stock returns. But evidence from case studies and management theories reveal the shortcomings of pursuing size for its own sake. Besides, there are

Marsden, and Veeraraghavan (2007) on CAPM residuals (unexplained variance) in relation to idiosyncratic risk suggests that the residuals may be linked to firm size with the smaller firms having higher residuals than do larger firms.

The above represent the many attempts in response to the fine tuning of CAPM's predictive power on asset returns in the trading markets by incorporating firm-specific variables. The most recent studies such as Lusk, Halperin & Bern (2008), Ferreira & Laux (2007), Drew, Marsden & Veeraraghavan (2007), and Fetcher (2007), on the other hand have been focusing on the filtered output of the CAPM model, or the residuals, in examining idiosyncratic risk profile of organization as the structural information employed to recalibrate the use of the CAPM as an effective tool in the firm's planning decision support system (Lusk et al., 2008). Other studies such as Goyal and Santa-Clara (2003) and Campbell, Lettau, Malkiel and Xu (2001) have provided foundation for the analysis of idiosyncratic risk. For instance, Lusk et al. (2008) presented an analysis on reformulating the CAPM with the focus on idiosyncratic risk and Roll's meta-analysis[16]. Based on Roll's (1988) meta-analysis of R^2 (coefficient of determination) which revealed that CAPM explained less than 50 percent of the relative linear movement of the firm's returns vis-à-vis those of the market, Lusk et al. (2008) attempted to sort out the structure of the uncertainty embodies in the unexplained variation - the residuals, or the idiosyncratic risk[17], which is given by 1–

also no solid theoretical supports for their inclusion in estimating a firm's risk premium. This argument also holds true for book-to-market value.

[16] See Roll, R. (1988), "R^2", *Journal of Finance* (July).

[17] Also variously referred to as non-systematic, unique or a-synchronous risk.

R^2. In doing so, Lusk et al. (2008) characterized the residuals of the CAPM by citing Knight's concept of uncertainty[18].

Lusk et al. (2008) replicated similar study by Boutin-Dufresne and Savaria (2004) by examining the residuals of the CAPM for organizations rated as to their corporate social responsibility (CSR), which has been identified as one of the several possible structural drivers of idiosyncratic risk, in an attempt to discern structural variable relationships associated with the idiosyncratic risk[19]. Boutin-Dufresne and Savaria (2004) found that there was a negative/inverse relationship between the CSR profile and idiosyncratic risk. Lusk et al. (2008) furthered the study by analyzing the CSR partition with the return/idiosyncratic risk relation. Specifically, Lusket al. (2008) investigated the profile relationship between Jensen's α[20] and $\text{IRisk}_{\text{BHL}}$[21] using the CSR profiles. The results found no evidence to support that there is a risk relationship relative to the CSR classification (i.e, high responsible-HR and low responsible-LR) of the firms. In addition, the results also failed to support the established notion of return/risk relationship for the LR group of firms.

[18] See section 2.1.2 on Knight's definition on risk and uncertainty.

[19] Other possible structural drivers of idiosyncratic risk identified are private information, corporate governance, firm size, executive compensation, and political instability.

[20] Jensen's α is the classic measure of the market benchmarked excess return from the mean variance CAPM given by *Jensen's* $\alpha = \check{r}_c - (\check{r}_i + \hat{\beta}_c\,[\check{r}_m - \check{r}_i])$.

[21] $\text{IRisk}_{\text{BHL}}$ is Ben-Horim/Levy formulation which has now become the standard measure of idiosyncratic risk: $IRisk_{BHL}\ a = \sigma_c - [\hat{\beta}_c \, x\, \sigma_m]\ \sigma_c - [\hat{\beta}_c \, x\, \sigma_m]$ (see Ben-Horim & Levy, 1980).

2.9.3 Unsystematic Risk and Risk Premium: CAPM modification

CAPM's theoretical framework clearly indicates that there is no favorable risk pricing effect for reduction in unsystematic risk, hence implying that any deliberate effort on the part of the firms to manage their unsystematic risk is futile. However, assuming if there would be a positive effect on managing unsystematic risk, how would this notion impact the variables in the CAPM formula then? It should follow that variable r, representing the required rate of return for an asset or a project, should be reduced due to the lower risk profile (either perceived or otherwise). A lowered r, which is also used for discounting firms' expected cash flows, should yield a higher firm value as follows:

$$\text{Firm value} = \sum E(CF_t) / (1 + r_t)^t$$

where $\sum E(CF_t)$ is the sum of all expected cash flows, t is the time period, and r is the discount rate. And according to NCFT, on the basis of maximizing shareholders' wealth, the appropriate firm-decision rule is for managers to pursue all investment opportunities that will yield a positive net present value (NPV) (Belmont, 2004).

In the CAPM's formula $E(r) = R_f + \beta^m{}_i\ [\ E(R_m) - R_f\ ]$, where R_f is the risk free rate, $\beta^m{}_i$ is the firm's (asset) beta or the correlation coefficient of that particular firm to the market portfolio. The term $[\ E(R_m) - R_f\ ]$ is the market potfolio's risk premium and the term $\beta^m{}_i\ [\ E(R_m) - R_f\ ]$ is the firm's risk premium. The reduction of expected or required rate of return, E(r), will be significantly influenced by the firm's risk premium term, or $\beta^m{}_i\ [\ E(R_m) - R_f\ ]$. The return on a risk-free asset (R_f) and the expected return on the market $[\ E(R_m)\ ]$ are externality variables to the firm that there is nothing much managers can do to influence them managerially other than to hope for market forces to change these variables in the favorable direction for risk pricing reduction. The same applies to the firm's beta (β^m_i). Beta measures the covariance of the firm's return to that of the market portfolio, or in other words, it is the measurement for the firm's systematic risk. The only way the beta of the firm will change is by way of the firm varying its existing business line so that its business risk profile is relative to that of the market shifts. One example of this is to initiate business diversification through either the firm's product lines or target markets. But this managerial maneuvering involves the systematic risk aspect of the firm. As such, in order to capture the positive effect of managing a firm's unsystematic risk and reflect it in the CAPM formulation, we may attempt to include an additional variable, i.e. μ, to impact the firm's risk premium term. This variable should take a negative value so that it can have diminishing effect on the term β^m_i [$E(R_m)$ - R_f] such that the new risk premium term of the firm becomes β^m_i [$E(R_m)$ - R_f] - μ. Thus, the modified CAPM formula that recognizes the effect of managing a firm's unsystematic risk shall be:

$$E(R_i) = R_f + \beta^m_i [\, E(R_m) - R_f \,] - \mu$$

Conceptually, it should be noted in the above formula that the effect of unsystematic risk does not come in the form of a direct reward for bearing them in the way similar to bearing systematic risk in the asset pricing model. Rather, the reward comes from the nature for its successful reduction or elimination. This notion runs contrary to the concept of market risk in asset pricing whereas investors are being rewarded for bearing market risk because it is not diversifiable. Nonetheless, the notion of unsystematic risk management does not suggest that firms be rewarded for bearing unsystematic risks. This is because those risks are diversifiable. However, the notion suggests that firms to be rewarded for their ability to reduce those unique risks that they face. The rationale for this reward system is by giving the recognition that managing firms' unsystematic risk can result in firms enhancing their capability to improve earnings. This earnings improvement can come in the form of reducing or eliminating negative profit variation, reducing cost of financial distress, minimizing agency problem, enhancing corporate brand name and the likes. Managers, thus, should endeavor to manage firms' unsystematic risk well enough to earn the largest possible value of $-\mu$ as possible from the investors in order to reduce the firms' required rate of return (risk premium) or cost of capital.

In the context of asset pricing, the idea for managing firms' unsystematic risk comes from the hypothesis where it is postulated that investors would welcome such a reduction in firms' specific risks. As a result, investors would demand a relatively lower risk premium for their investment in the firm. Neverheless, in transforming the above hypothesis into precise mathematical formulation, the challenge would emerge in the area of firms' valuation. The measurability of firms' value enhancement as a result of this unsystematic risk management would hinge on the market's ability to identify and quantify the reduction of each firm-specific risk for a reward (i.e. the reduction in discount rate), that is, the μ, as mentioned above.

2.9.4 The rebuttal

According to modern financial theory, managing unsystematic risk will not be rewarded by the stock market (Bettis, 1983). However, Bettis (1983) highlighted that the idea of managers should not be concerned with managing unsystematic risk is contradicting with the notion of corporate strategy and the theory of strategic management. This contradiction is vividly highlighted with Salter and Weinhold's

(1979, p.106) account on managerial behavior that: "Given a business opportunity producing a cash flow, the risk/return model emphasizes that market value will be affected by managing systematic risk rather than unsystematic, or company specific risks. Ironically, managers spend most of their efforts on these very real company specific risks (such as competitive retaliation, labor relations, or even bankruptcy) which are both obvious and immediate, as well as being potentially disastrous to personal and organizational welfare" (Salter and Weinhold quoted by Bettis, 1983, p.408). This managerial situation is very true considering that unsystematic risks are associated with firms' specific resources and competencies. Moreover, the risks are also linked to the firms' operating environment (Bettis, 1983). To this end, Andrews (1980) argued that managing these unsystematic risks become inherent in the concept of matching corporate resources and competencies to opportunities within the firms' environment (Andrews quoted by Bettis, 1983).

Bettis (1983) indicated that there had been many studies that had showed the success of companies through strategic management that relied on the strategic adaptation by skillful, rigorous, and continuous management of unsystematic risk. Examples are those empirical studies of company success by Hall (1980) and Mintzberg, (1987), theoretical explanations in industrial economics (Penrose, 1959), a massive study of industrial history (Chandler, 1962; 1977). Apart from these, in the area of organizational theory, studies by Chakravarthy (1982), Child (1972), and Summer (1980) indicated effective management of unsystematic risk was the central cause of organizational evolution, where "the cause that determines which organizations survive and grow and which decline and die" (Bettis, 1983, p.408).

In the marketing domain, one example of unsystematic risks in the context of corporate strategy management is the issue of entry barriers. For instance, Van Horne (1980) cited specific management of unsystematic risk in managing the risk of a new entrant into a market where a firm is competing. To manage this risk it will entail the formulation of strategy for deterring such new entrants. Hence, corporate strategy will require managers to devote attention to barriers of entry. One such strategy researcher that has notably been arguing the importance of managing barriers of entry under various conditions for firms to stay competitive in the market place is Porter (1980). Studies in industrial organization economics such as Shepherd (1979) and Scherer (1980) also gave generic conclusion that the profit potential of an industry or individual firm was influenced by the height of barriers to entry.

Thus, a manager who does not manage unsystematic risk (i.e. entry barriers as in the above examples) is to ignore an important element of strategy (Bettis, 1983).

2.10 A STRATEGIC CONCEPTUALIZATION OF RISK PREMIUM: THE CLS MODEL

We can conclude from the above discussion that the views of modern financial theory (neo-classical finance theory) and that of strategy theory are somehow contradicting when it comes to corporate risk management and specifically in the context of the efficacy of ERM. In effect, the conclusions of modern financial theory also run contrary to that of classical theory (i.e. Markowitz) in this respect. Nevertheless, as Bettis (1983, p.409) aptly put it: "To alter either result is to disrupt significantly the logical structure of the underlying discipline". But then, how can one provide plausible and sensible explanations in an effort to describe this discrepancy and to even reconcile the difference? Therefore, it will be of great interest and significance to attempt to provide a theoretical linkage among the three schools of thought, namely the classical finance theory, neo-classical finance theory, and strategy theory. This thesis, hence, endeavors to provide such linkage.

To begin with, we may describe the apparent contradictory conclusions of neo-classical financial theory (NCFT) which sits on one camp and classical/strategy theory on the other by drawing reference to some anecdotal evidences of the practices of corporate risk management in the real world. Risk management in the context of NCFT would only mean diversification, asset allocation and to a certain extent, the hedging or transfer of risk (Belmont, 2004). However, Belmont (2004, p.21) also pointed out that, in the real world realm, corporate risk management activities include "a logical and systematic method of establishing the context, identifying, analyzing, evaluating, mitigating, monitoring and communicating risk associated with any financial activity, function or process in a way that will enable organizations to minimize financial losses and maximize financial opportunities".

This description by Belmont (2004) on the ultimate purpose of corporate risk management (i.e. minimizing financial losses and maximizing financial opportunities), however, is still not as comprehensive as what this thesis will be defining for the concept of enterprise risk management (ERM). In the context of ERM, its framework shares the same logical and systematic method as the above risk management procedures mentioned by Belmont (2004). However, ERM will go further by establishing additional goals of dealing with all business activities, from financial to operational, and to minimize/maximize not only financial losses/opportunities, but also other aspect of business losses/opportunities such as reputation, branding, governance, and corporate entrepreneurship, to name a few. The operational definition of ERM is given in earlier section of this chapter.

Another stark distinction of the concept of ERM as compared to the notion of risk management by NCFT is the management of unsystematic risk or firm-specific risk. In effect, apart from managing systematic risks, ERM also highlights the importance for managing unsystematic risk with the belief that it will lead to an enhanced shareholders' value. This concept blends well with the value-enhancing notion as postulated by strategy theory. Hence, to bridge the gap of the seemingly contradicting arguments regarding unsystematic risk management between modern financial theory and strategy research, it requires a model that fits well within the two contradicting schools of thought. This model shall serve as the value enhancing transmission mechanism of ERM. One such plausible model is related to the risk premium of the firm. In this light, this thesis attempt to theorize a model capturing the causal relationships of the risks that are strategically associated with the firm's performance. This thesis directs its research lens toward the notion of managing firms' unsystematic (specific) risk via an enterprise risk management framework that leads to the enhancement of shareholders' value. The mechanism through which firms' value enhancement takes place is by developing a strategic conceptualization of risk premium.

The focus is on the adaptation of a model called "a dynamic framework of a firm's risk premium" developed by Chatterjee, Lubatkin, and Schulze (1999) which will reconcile and fill in the gap between modern financial theory and strategy theory. Throughout this thesis, this risk premium model developed by Chatterjee et al. (1999) is referred to as the **CLS (risk premium) model.**

2.10.1 The CLS risk premium model

The CLS risk premium model was developed based on the assumption that investors do care about firm-specific risk. This is owing to the fact most investors are not as fully diversified and markets are not as perfect as CAPM assumes. The interactions among constructs in the model take reference from information economics, resource-based view of the firm, and the industry structural view of strategy (Chatterjee et al., 1999). The information economics highlights the existence of information asymmetries in the market and notices that the belief among market participants to be heterogeneous. The resource-based view of the firm provides explanation that the asymmetries that happen in the resources markets are caused by the characteristics of the resources in which they are lumpy, heterogeneous, and to be acquired with a cost. The industry structural view of strategy on the other hand, sees asymmetries in market power distribution in the input and output markets (Chatterjee et al., 1999).

In developing the CLS risk premium model, Chatterjee et al. (1999) postulated that investors are exposed to various classes of firm-specific risk in a world of partial diversification and imperfect markets. This notion forms the core of the CLS model. In other words, CLS model makes extension to the CAPM notion where apart from recognizing the sensitivity of a firm's expected returns to macroeconomic uncertainties, CLS risk premium model also gives inclusion to the sensitivity of a firm's expected returns to three additional classes of firm-specific risks. This is the part where CAPM has omitted. CLS risk premium model categorizes these three classes of unsystematic risk as *tactical*, *strategic*, and *normative* risk. As Chatterjee et al. (1999) pointed out tactical risk exists mainly in information asymmetries, whilst strategic risk comes from imperfections in the resource and output markets, and finally normative risk presents itself in the forces that define institutional norms.

2.10.2 Tactical risk

The nature of tactical risk lies with the uncertainty in firm's expected earnings. It is based on the assumption that investors are averse to earnings surprises owing to information asymmetries. Hence, investors will request lower risk premium from firms who can stabilize earnings. Firms can employ three strategies to manage tactical risk, i.e. the use of financial tactics, hedges, and real options. Chatterjee et al. (1999) pointed out that financial tactics include earnings management, governance, and liquidity. He cited earnings management literature which indicates that the use of financial tactics can minimize information asymmetries that exist between management and investors. This will result in enhancing investors' ability to forecast earnings. Chatterjee et al. (1999) also pointed to Healy & Palepu (1995) which provided theoretical and Chaney & Lewis (1995) which provided empirical evidence that firms can reduce their risk premium if they can reduce this source of tactical risk for investors by developing a reputation to minimize earnings surprises. Smith et al. (1994) cited example of GE's low risk premium owing to the management's rapport and effort in helping investors to forecast earning estimates. It also cited Disney's low risk premium partly to the use of specific accounting and sales scheduling tactics in smoothing out earnings. Kanagaretnam, Lobo & Mathieu (2004) found evidence in the banking industry to support the hypothesis of earnings management to reduce earnings variability, which in turn led to favorable risk premium reflected in share prices and the cost of capital. Thus, CLS risk premium model posits that earning management serves to directly link firm-specific actions and risk premium. This is depicted by **arrow H** in Figure 2.3.

Empirical studies such as Hughes, Liu and Liu (2007) and Morkoetter and Westerfeld (2009) further support the information asymmetry-risk premium argument. For instance, Hughes et al. (2007) investigated how asymmetric information affected a firm's cost of capital. The study examined the impacts of private signals that were informative of both systematic factors and idiosyncratic shocks in influencing asset payoffs. Keeping total information constant, Hughes et al. (2007) found that greater asymmetry led to higher factor risk premium, hence higher costs of capital. Morkoetter and Westerfeld (2009) on the other hand highlighted the important roles of credit rating agencies which acted as information agents in overcoming information asymmetries that exist between investors of collateralized debt obligations (CDO) markets and the issuers. Morkoetter and Westerfeld (2009) argued that the incorporation of incremental information through assigned ratings will reduce information asymmetry, thus increased transparency. This resulted in lowering investors' demand for risk premium and leading to lower credit spreads. Markoetter and Westerfeld's (2009) empirical analysis found that on average credit spreads decreased with an increasing number of ratings.

Besides earnings management literature, Chatterjee et al. (1999) also found support of the above firm-specific actions and risk premium relationship in governance, liquidity, hedging, real options, and strategy literature. For instance, governance literature indicates that investors will raise a firm's risk premium if the firm fails to provide satisfactory market oversight by adopting a poison pill tactic. On the other hand, Gardiol et al. (1997) and Lehn et al. (1990) suggested that if a firm develops a reputation for achieving predictable growth, investors will not only lower the firm's risk premium, they will also allow its management some freedom to decide on the type of information to be made public, as well as allow the management voting control of the firm through dual class share (Gardiol et al. and Lehn et al. quoted by Chatterjee et al., 1999).

In liquidity literature, Brunnermeier and Pedersen (2009) presented an empirical model that linked an asset's market liquidity and traders' funding liquidity. The study showed that under certain conditions, margins would be destabilized and market liquidity and funding liquidity were mutually reinforcing, leading to liquidity spiral. The model predicted that speculators' capital was a driver of market liquidity and risk premiums (Brunnermeier & Pedersen, 2009). Tarek (2009, p.46) presented empirical evidence that liquidity risk was a factor to be priced for the yield spread of risky corporate bonds and that "the associated liquidity risk premia helps to explain the credit spread puzzle". Kim's (2008) empirical study found that liquidity constraint played a crucial part in determining yield spreads. The study concluded that the expectation hypothesis of the term structure of interest rates could be supported when incorporating liquidity and risk premiums. Gardiol et al. (1997) postulated that stock liquidity has direct linkage with a firm's risk premium in that it affects an investor's potential cost of existing from an investment. A firm with illiquid shares outstanding will find investors asking for higher risk premium. As such, a firm can increase liquidity by splitting its stock to lower its risk premium (Gardiol et al., 1997). The above relationships between liquidity and risk premium are illustrated by **arrow H** in Figure 2.3.

The hedging and real options literature describes tactics that present indirect relationship between firm-specific actions and macro-economic risk. This indirect linkage is indicated by **arrow I** in Figure 2.3. Chatterjee et al. (1999) presented anecdotal (Froot et al., 1994), theoretical (Smith, 1996; Smith & Stulz, 1985), and empirical (Froot et al., 1993) evidence that the effective use of hedges[22] and real options[23] by firms will result in investors requiring lower risk premiums. This is because the use of hedges and real options enables the firms to reduce the probability of earning surprises. For example, hedges function as "contingent commitments that minimize the sensitivity of a firm's future earnings to cyclical and random variations in the price of those commodities the firm considers essential to its particular value chain" (Chatterjee et al., 1999, p.559). The use of these instruments also offers flexibility to firms because they do not incur firms as significant an opportunity costs as those incurred by fixed resource commitments (Chatterjee et al., 1999).

[22] Hedges include derivatives, swaps, futures contracts, and options. Financial hedges reduce the possibility of default whilst adding to a firm's debt capacity. Non-financial hedges, such as futures contracts, grant the firm the right to take possession of commodities at a later date.
[23] Real options are contingent commitments made by a firm that grant it the right to secure non-commodity resources at a later date.

The above argument is supported by Lee and Makhija (2009) who found evidence that the flexibility provided by real options of international investment could create value for firms when faced with domestic economic uncertainty. This was true when the international investment network was characterized by greater breadth and lower depth (Lee & Makhija, 2009). Gaur and Seshadri (2005) on the other hand presented the construction of optimal hedging transactions for inventory risk to minimize the variance of profit and increase the expected utility for a risk-adverse decision maker. This hedging strategy catered for a short life cycle or seasonal inventory when its demand was correlated with the price of a financial asset (Gaur & Seshadri, 2005). In addition, Mieghem (2003) highlighted that risk aversion contributed to the firm's capacity problems and that financial and operational hedging could reduce the risk associated with capacity investments.

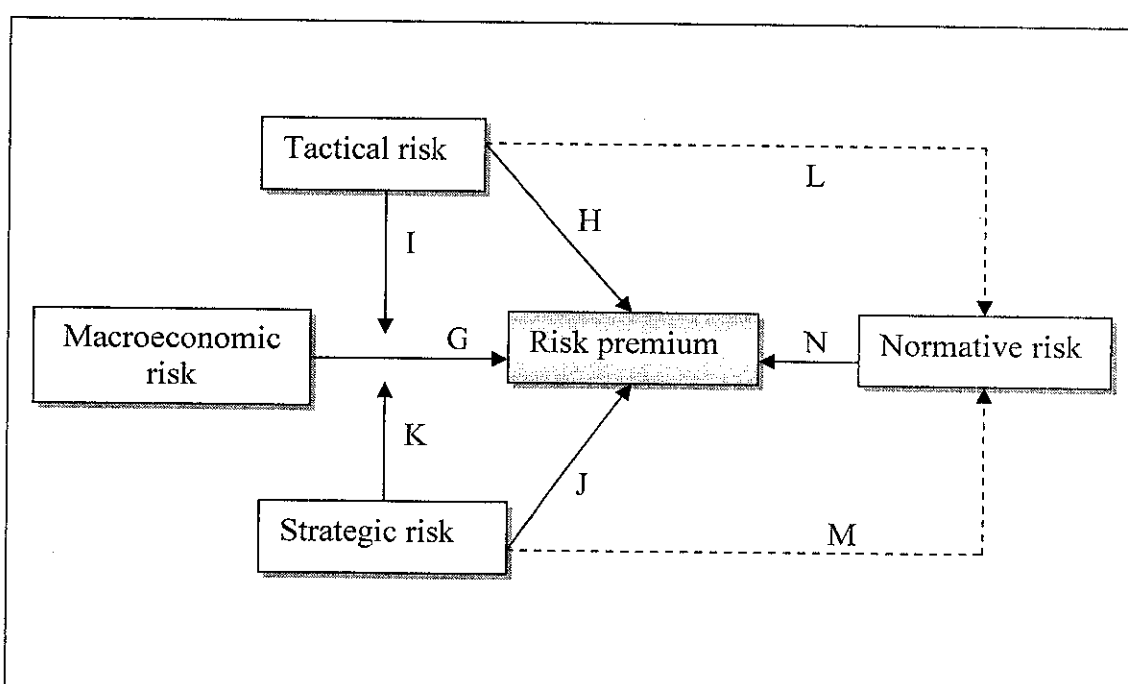

Figure 2.3: The CLS Risk Premium Model

The above discussion of tactical risk presented by various research streams (i.e. earnings management, governance, liquidity, hedging, and real options) has lent support to the argument that some firm-specific activities are relevant to investors. The conclusion of which posits that by managing this tactical risk that is rooted in informational asymmetries in the market between managers and investors, it will lower the variance of a firm's expected earnings by way of minimizing its earnings surprises. This in turn, will result in investors demanding lower risk premium from the firms (Chatterjee et al., 1999).

2.10.3 Strategic risk

The nature of strategic risk is due to the uncertain performance outcomes from the firm's committed resources. It is caused mainly by imperfections in resource and output markets (Chatterjee et al., 1999). Since firms' survival in the marketplace hinges on how well the firms formulate strategy in committing and deploying their scarce yet precious resources to stay competitive, it follows that risks exist if the goal to attain and sustain such competitive advantage from the committed resources cannot be achieved. Thus CLS model defines strategic risk as "the probability that a firm can isolate its earnings from macroeconomic and industry-specific disturbances" (Chatterjee et al., 1999:560). This risk is represented by **arrows J** and **K** in Figure 2.3.

The concept of earnings isolation can find its core in strategy literature such as those of Barney (1991) and Rumelt (1984). As pointed out by Chtterjee at al. (1999), strategy literature provides good accounts for various determinants of strategic risk. These include the firm-structure view, resource-based view, knowledge-based view, and strategic options view.

For instance, Porter (1980) analyzed strategic risk from the firm-structure view. He categorized strategic risk in his "five forces" analysis of market rivalry and "diamond theory" of national competitive advantage (Daniels et al., 2007; Chatterjee et al., 1999). Porter's five forces of market rivalry are (1) supplier power, (2) threat of substitutes, (3) degree of rivalry, (4) buyer power, and (5) barriers to entry (ICMBA, 2007). Porter's four determinants of diamond theory for national competitive advantage include (1) factor endowment, (2) demand conditions, (3) related and supporting industries, and (4) firm strategy, structure, and rivalry (Daniels et al., 2007). According to Porter's diamond theory of competitive advantage, one determinant for firms' to attain competitive advantage lies with the firms' "strategy, structure, and rivalry" (Daniels et al., 2007).

Porter also stressed that due to the fact that the five forces of strategic risk (market rivalry) are asymmetrically distributed in industries, firms whose organization possess structural advantage may flex their muscles in order to isolate their earnings from their rivals' onslaught (degree of rivalry) as well as from potential threat coming from the remaining four forces (ICMBA, 2007; Chatterjee et al., 1999). Owing to this, Chatterjee at al. (1999) postulated that firms that are able to flex their market power to stabilize and enhance their cash flows by leveraging and sustaining their structural advantages will enjoy lower risk premiums.

On the other front, the resource-based view (RBV) of strategic risk argues that a firm may keep its resource-based advantages from the knowledge of its rivals. This is because valuable resources are sometimes intangible and tacit, coupled with the fact that their distribution is not homogeneous. The nature of these advantages hence, enables a firm to keep them invisible from the detection of competitors. As a result, it will help cripple competitors' effort to strategize against the firm (Barney, 1991; Connor, 1991).

As such, a firm with resource-based advantage will be able to isolate itself from market pressures, similar to that of structural advantages (Chatterjee et al., 1999). For example, Porter noted that to reduce demand-side risk, a firm can strategize customer loyalty program such as offering better quality good and services at lower cost than its rivals to ride through cyclical downturns (Porter quoted by Chatterjee et al., 1999). Similarly, to handle supply-side risk, a firm can forge strategic alliances with its suppliers and manage its factors of production and supply chain more effectively (Daniels et al., 2007; Russell & Taylor, 2003).

Referring to Lane & Lubatkin on the knowledge-based view of a firm's strategic risk, Chatterjee et al. (1999, p.561) pointed out that "the ability of firms to absorb, interpret, and commercialize critical information on a timely basis is also asymmetrically distributed". Chatterjee et al. (1999, p.561) cited Intel and Microsoft as firms which may enjoy low risk premiums because their knowledge advantages on innovation enable them to reinvent their product life cycles, "create asymmetries for future advantage, and partially isolate their earnings from technological obsolescence".

Chatterjee at al. (1999) deduced the fourth and last determinant of strategic risk from strategic options literature such as that of Sanchez (1993). Chatterjee et al. (1999) explained that strategic options might have originated from "real" options, which are contingent in nature, but later turned to its form when firm committed its resources to the contracts due to changes in market conditions. According to Raynor (2008), strategic options are fundamentally different from growth options in that their focus is not to create possible avenue for new growth, but to create the opportunity to redirect strategy in the existing business model. Chatterjee et al. (1999, p.561) reckoned that strategic options are investments that are difficult to undo once committed. Firms undertake such commitment in order to "mitigate specific sources of macroeconomic and industry-specific disturbances risk". Miller (1998) noted that the use of strategic options is due to the unavailability of other type of options, like hedges. Nonetheless, Raynor (2008) pointed out that to manage strategic risk effectively a firm has to establish a portfolio of strategic options so that it can create "strategic flexibility" without compromising the need to commit.

Examples of strategic options are such as a firm may develop fee-earning services to subsidize other activities – a case of cross subsidy of activities (DCG, 2006). A firm may also diversify to other sector of economy to reduce its single business exposure. In the service industry, a firm can expand by adding services to an unrelated client group or to an unrelated type of service, or in an unrelated area (DCG, 2006). Miller (1998) suggested acquiring a key supplier so to minimize the sensitivity of its cash flows to price variability of non-commodity inputs.

In summary, based on the above various views (firm-structure, resource-based, knowledge-based, and strategic options) of strategic risk faced by the firms, the CLS risk premium model posits that "investors require a lower risk premium for firms that achieve a degree of isolation from market forces because these firms can offer investors the promise of stable earnings and growth" (Chatterjee at al., 1999, p.560).

2.10.4 Normative risk and dynamic forces

CLS model posits that risk premium advantages attained through active management of tactical and strategic risks are temporary. Due to competitive forces, any previous advantages will be imitated by competitors and will be neutralized after some time. At this point, the ability of tactical and strategic risk management to reduce risk premium will diminish and they will become "nothing more than a source of variance about some baseline level of firm-specific risk" (Chatterjee et al., 1999, p.562). Tactical and strategic actions will then lose its uniqueness and differentiating factor but become institutionalized and pre-requisites for firm to stay in the industry (Chatterjee et al., 1999; Scott, 1995; Hamel & Prahalad, 1994). This relationship is presented by **arrows L** and **M** in Figure 2.3.

Normative risk, thus, is defined as the risk premium (or penalty) that a firm is subjected to if it fails to comply with its institutional norms or rules that it is expected to follow (Gunningham et al., 2005; Graf, 2004; Chatterjee et al., 1999). These norms represent the common expectations of the firm's stakeholders (i.e. investors, regulators, interest groups) with regards to its behavior (Graf, 2004). CLS model stresses that complying to pre-requisite norms will not yield firms any reward but will be slapped with higher risk premium if firms fail to observe them. This is owing to investors having to bear additional risk without the promise of higher return (Chatterjee et al., 1999).

Financial accounting literature such as Jones (1996) provided indirect support for this assertion. Jones (1996) noted consistent evidence that the incremental information provided by going-concern audit opinions had an influence on investors' reaction. Gunningham et al. (2005) on the other hand examined regulated firms' perceptions in the electroplating and chemical industries of how various instrumental, normative, and social factors motivated these firms' environmental compliance actions. The study found that "implicit general deterrence", i.e. the overall effect of sustained inspection and enforcement activity, was far more vital than either specific or general deterrence. The study concluded that most reputation-sensitive firms in the environmentally sensitive chemical industry opted to act significantly above compliance for reasons that were related to risk management as well as to the perceived requirement to safeguard their social license to operate. Apart from that, almost half of the respondents cited normative explanations for their compliance (Gunningham et al., 2005).

Relationship of the above argument is depicted by **arrow N** in Figure 2.3.

Chatterjee et al. (1999) also posited that tactical risk premium advantage (i.e. lowering the variance of expected earnings through minimizing information asymmetries) is more susceptible to "isomorphic pressure" than strategic risk premium advantage to be transformed into normative activities. This is because competencies attained through tactical activities are more common and imitable (i.e. tactical activities can be outsourced to financial intermediaries).

As for strategic activities, Chatterjee et al. (1999) deduced from Miller (1998) that strategic risk premium advantage (i.e. a firm's ability to isolate its earnings from market forces) is itself the function of macroeconomic variability. For instance, fluctuation in foreign exchange rates can affect a firm's cost strategy. In other words, sources of isolation will become less "strategic" when competitive forces weaken the effect of structural advantages. As such, CLS model posits that "market forces transform competitive advantage from firm-specific determinants of risk premium to institutional norms" (Chatterjee et al., 1999, p.562). This hypothesis is indirectly supported by evidences presented by Chan & Chen (1991) and Fama & French (1995). Both studies concluded that firms suffer higher risk premium as soon as expectation build up that the sustainability of firms' current earnings are in question, long before they actually decline.

However, as the adage of "what goes around comes around", Chatterjee et al. (1999) theorized those activities that have been institutionalized may once again be linked to a firm's strategic risk profile. This is due to the fact that institutional norms may be transformed by changes in the macroeconomic environment or by the formulation of new strategies. This notion is in tandem with conventional strategic thought for a firm to reinvent itself in facing market challenges by "finding new uses for existing resources and capabilities" or by "changing the rules of the game" (Chatterjee et al., 1999, p.562).

Nevertheless, as in the words of Chatterjee et al. (1999, p.563), "norms impart a neutral influence on the risk premium unless mismanaged". This nature of normative risk is obviously different from those of tactical and strategic risks which firms can actively manage so to create asymmetries into their risk premium advantages vis-à-vis their rivals. As in the case of institutional norms and industry rules, firms have to ensure their proper compliances so to avoid penalty charged onto their risk premium.

2.10.5 CLS risk premium model in summary

CLS risk premium model highlights the notion that there are dynamic relationships between unsystematic risk (i.e. tactical, strategic, and normative risks) and a firm's risk premium. Thus, firm-specific activities and skills derived from the active management of those risks will influence a firm's risk premium. This argument is well supported by the current theories of strategy (Graf, 2004). However, this assertion is apparently inconsistent with CAPM which does not acknowledge such a relationship. CAPM defines that all firm-specific activities, which are measured by the variance of the error term in the market model, as unsystematic risk. This unsystematic risk is not correlated with risk premium. Thus, it is irrelevant (Belmont, 2004; Chatterjee et al., 1999). Nonetheless, as discussed, the theory of CAPM has been subjected to many challenges of late. This is especially so with the *beta* being doubted by many studies to be a reliable proxy for the firm's risk premium (Adrian & Franzoni, 2009; Lusk et al., 2008; Guo, 2004; Fama & French, 2003).

The concept of CLS model, on the other hand, takes a multivariate approach. The constructs of the model include macroeconomic, tactical, strategic, and normative risks, all of which are omitted by CAPM. Besides, CSL model also pays due recognition to the dynamic of the continuous interplay between elements of the firm's activities and market forces. This approach of conceptual assertion not only comes in tandem with the studies of strategic management, but also offers to connect the former with the theories in financial economics in providing a solid and robust conceptual framework for *enterprise risk management* (ERM). This linkage of theories from the two disciplines (i.e. strategic management and financial economics) enables the building of a new theory postulating that ERM can lead to improved business performance and enhanced shareholders value. In effect, Chatterjee et al. (1999, p.563) suggested building "a more conceptually complete asset pricing model" with the combination of contributions from the empirical discovery of financial economics as well as the conceptual description of strategic management.

Risk premium is a crucial element for firms. It has a profound impact on firms' cost of capital. Firms with risky profiles in the eyes of investors will suffer from incurring higher costs when raising capital. This comes in the form of either selling equity at lower prices or issuing bond/debt with higher coupon/interest rates (Tarek, 2009; Kim, 2008; Hughes et al., 2007). Firms encountering this situation will face an unfavorable strategic opportunity set (Copeland et al., 2005). Besides, higher capital costs will return lower present value when discounting firm's future earnings. As such it can become a source of competitive disadvantage when a firm faces its rivals in accessing capital markets (Belmont, 2004; Chatterjee et al., 1999).

Table 2.1 provides a summary of the structural framework and the relevant literature relating to the strategic conceptualization of risk premium or the CLS model.

Table 2.1: Strategic Conceptualization of Risk Premium (CLS model)

Firm-specific Risk Class	Definition	Source of Risk	Relevant Literature	Risk Management Objective	Action
Tactical	Uncertainty in firm's expected earnings	Informational Asymmetries	Earnings management Governance management Liquidity management Information management Hedging Real options	To lower the variance of expected earnings through minimizing earnings surprises/ variation from informational asymmetries	Engage in financial tactics, e.g. hedges and real options contracts
Strategic	Uncertainty in performance outcomes of committed resources	Resource and output markets imperfection	Strategy Firm-structured view Resource-based view Knowledge-based view Strategic options	To isolate earnings from macroeconomic and industry-specific disturbances	Shape market forces in firm's competitive arena to gain advantage
Normative	Incurring risk premium for failing to comply with institutionally expected norms	Forces of institutional norms	Diminishing competitive advantage view Dynamic market forces view	To reduce cost and avoid bearing additional risk without the promise of higher return	Comply to industry rules and conform to institutionally expected norms

CHAPTER 3 RESEARCH DESIGN AND METHODOLOGY

3.1 THE CONCEPTUAL FRAMEWORK

Based on the theoretical argument laid out in chapter 2 which in particular takes reference on the value maximization theory of corporate risk management, this research posits that implementation of ERM program by firms can create value for shareholders. The conceptual framework is such that ERM implementation will lead to some tangible and intangible benefits to the firm. These benefits include outcomes like optimizing risk/return profile of the company, reducing earning volatility (Lam, 2003), strengthening management's confidence in business operations and risk monitoring, creating smooth governance procedures, enriching corporate reputation, improving clarity of organization-wide decision making and chain of command, encouraging corporate entrepreneurship, and boosting enterprise's profitability (Crouhy et al.,2006; Bailey et al., 2004; Belmont, 2004; Lam, 2003; Bettis, 1983). These benefits derived from ERM implementation, in turn, will define the distinctive competitiveness of the firm. This causal relationship is depicted by the arrow **A** in the path diagram in Figure 3.1.

However, the study reckons that any potential challenges that may be faced by the firm either before or during the implementation process will affect its commitment and intensity level for its planned ERM program. These challenges can be in the areas of finance, people, information, infrastructure, structure, and priorities. These challenges become a factor affecting the intensity and commitment levels of ERM practices by the firm. The influence of this moderating factor is represented by the dotted arrow **B**.

All the tangible and intangible benefits as a result of ERM program implementation will then lead to lower cost of capital as shown by arrow **C** and contribute to improved business performance, i.e. improved price-to-earning ratio of share price, as depicted by arrow **D**. The lowering of cost of capital is due to risk premium reduction as a result of the firm lowering its idiosyncratic or unsystematic risk profile[24]. The improving price-to-earning ratio of the firm's share prices on the other hand, happens because investors are willing to pay a higher price for the company's share at a given level of earning-per-share (EPS) due to the firm's perceived lower risk profile. These two causal relationships represent the value creation from ERM program.

[24] Discussion of the research model on the interaction between a risk premium framework and the firm's unsystematic risk is presented in the later part of this chapter.

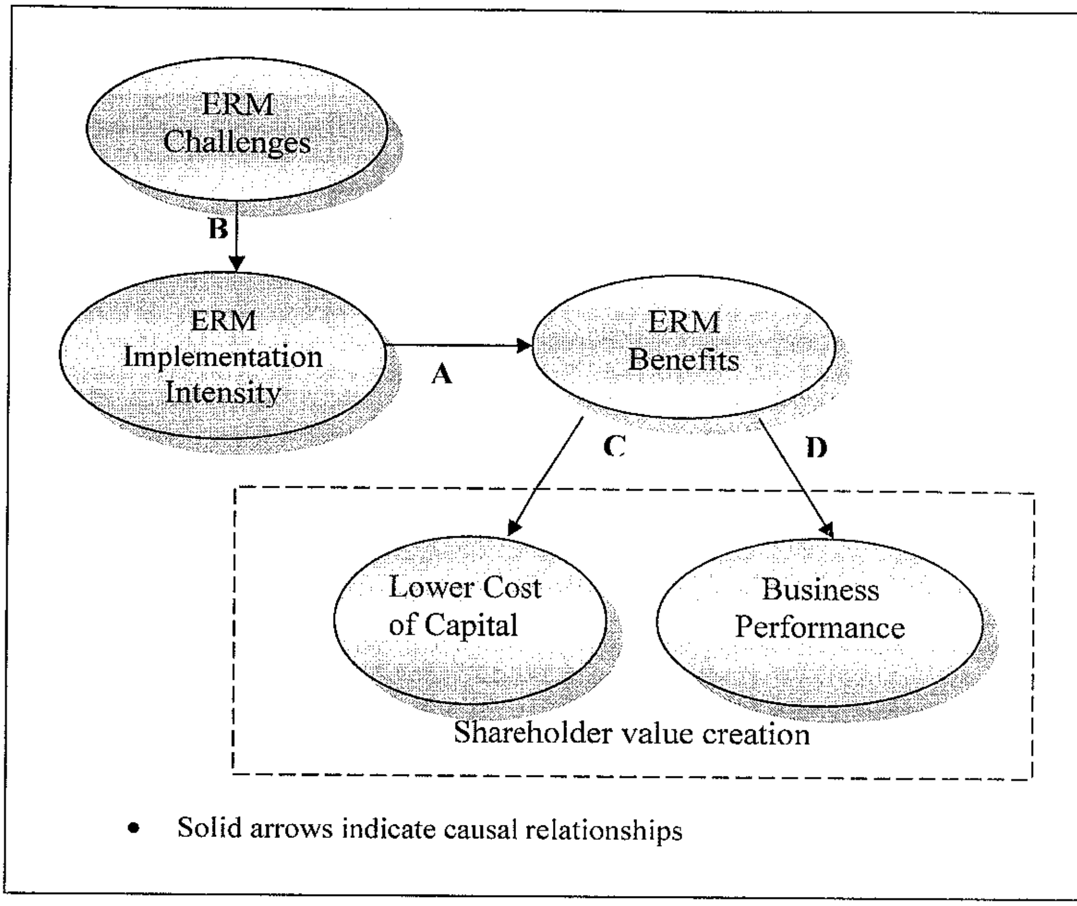

Figure 3.1: Path Diagram of Conceptual Framework

3.1.1 Empirical support for ERM

A recent survey conducted by the Economist Intelligence Unit Limited of senior managers indicated that 84% of the respondents believed that enterprise risk management can improve price-to-earning ratios and the cost of capital (Belmont, 2004). These two variables are measurement for shareholder value.

From the above study it indicates that there is a link between risk management and shareholder value creation whereby risk management can improve returns to shareholders and reduce the cost of capital. Other literatures, such as Bailey et al. (2004), Lam (2003), Liebenberg and Hoyt (2003), Bierc (2003), Crouhy et al. (2000), Markides (1994), also indicate similar support to the above linkage.

3.2 THE PRACTICAL FRAMEWORK

As has been mentioned previously in Chapter 1 of this thesis, this study attempts to ascertain several interrelated questions in relation to *enterprise risk management (ERM)* for Corporate Malaysia. For starters, what are the variables that determine the commitment and intensity level of firms' ERM implementation program? Secondly, what benefits can Corporate Malaysia expect from an effective implementation and a successful ERM program. These questions epitomize a series of issues which is of both managerial and theoretical importance.

With these research questions, this study theorizes that the commitment and implementation intensity of ERM program will be determined by the various challenges faced during such implementation process. The implementation intensity, in turn, will determine the amount of benefits received by the firm. The thesis continue to theorize that in the event of corporations successfully implementing the ERM program, the benefits received from such effective execution will have a long-term positive impact in creating value for the corporations' shareholders. This value creation process is achieved via a two-pronged process. Firstly, shareholders' value is created by way of lowering the corporations' cost of capital which takes place through a dynamic framework of risk premium reduction mechanism (CLS risk premium model) as discussed earlier. Secondly, the value is created by means of a generic improvement of business performance. This improvement encompasses all functional areas such as finance, operations, marketing, human resources, and governance. The final result of this two-pronged value creation process is the higher return of share prices for shareholders. These theoretical relationships are depicted by Figure 3.2.

We define the scope of this study in the area of empirical testing the significance of causal relationships among *ERM program challenges*, *ERM implementation intensity*, and *ERM benefit* as represented by the solid arrow lines depicted in Figure 3.2. We refer to this part of Figure 3.2 as the **practical framework** whilst we denote the entire causal relationships portrayed in Figure 3.2 as the **conceptual framework**. The underlying theoretical foundations (**theoretical framework**) supporting the conceptual framework has been discussed in section 2.9 to 2.10. Due to practicality and to optimize the research scope, data collection and the subsequent empirical testing had been geared towards examining the practical framework. As a result, the practical framework became a predictive model for a successful implementation of ERM program by Corporate Malaysia.

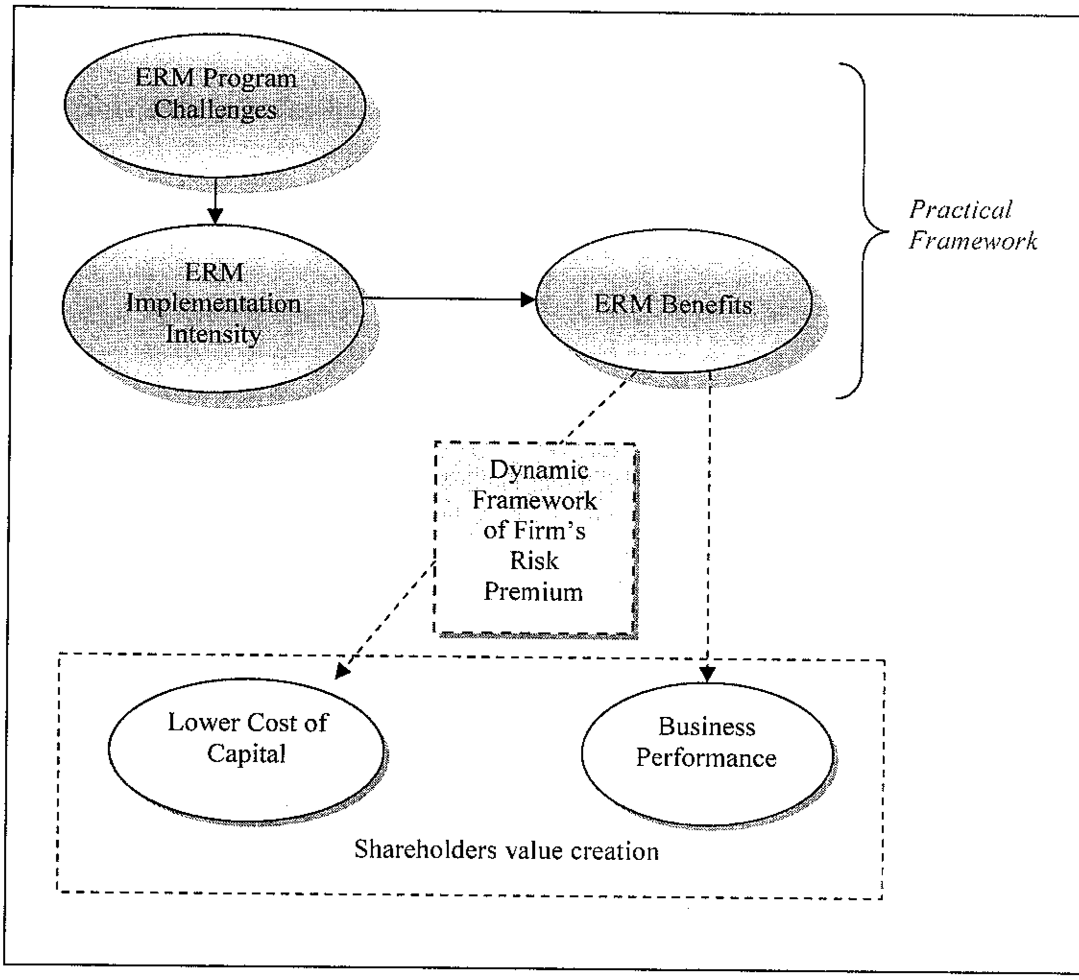

Figure 3.2: Conceptual Framework Diagram

3.3 HYPOTHESES DEVELOPMENT

Based on the *conceptual* and *practical* frameworks discussed in sections 3.1 - 3.2 and with their graphical representation in Figure 3.2, this study develops several hypotheses in an attempt to test the validity through statistical significance of the value creation or value maximization theory of enterprise risk management that it posits. Literature of the relevant theories that builds up this study's proposition has been presented extensively in Chapter 2.

3.3.1 *Hypothesis on the ERM Practical Framework*

For starters, this study zooms in on the theorized ERM *practical framework* which highlights the causal relationships among the various pertinent constructs as portrayed in Figure 3.3, namely, *Implementation Challenge*, *ERM Implementation Intensity*, and *Perceived ERM Benefit Measures*. Each of this construct is measured by several relevant variables. The details of these construct-measurement relations are discussed in the later part of this chapter. Two general hypotheses have been developed to reflect the manner in which these causal relationships are intertwined, i.e. H_1, and H_2, as below. The causal relationships denote that effective implementation of ERM program can lead to shareholders value creation whilst certain challenges are present during such implementation:

H_1: *ERM Implementation Intensity* has a positive effect on *Perceived ERM Benefit Measures*

H_2: *Implementation Challenge* has a negative effect on *ERM Implementation Intensity*

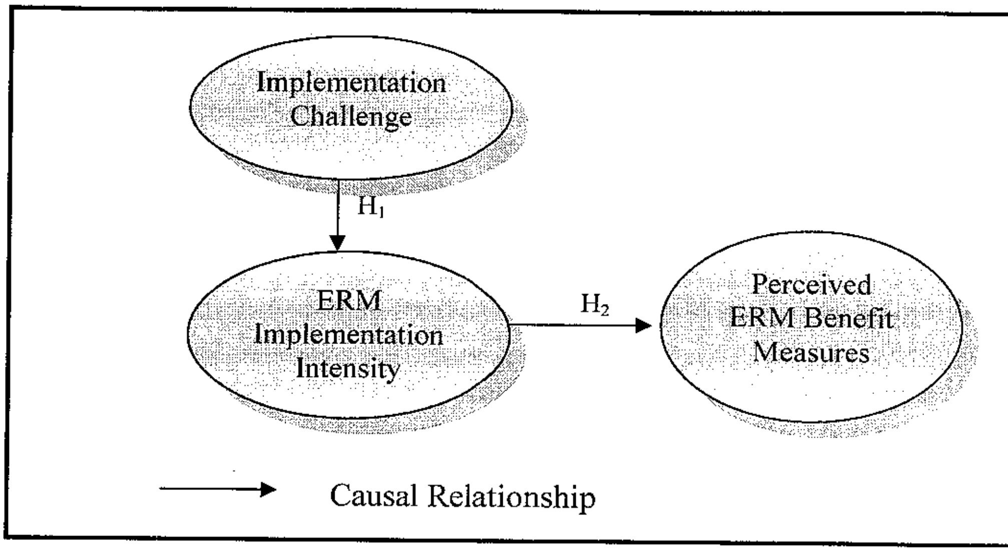

Figure 3.3: The Practical Framework

H_1 is to challenge neo-classical finance theory (NCFT) which says that since investors have access to diversification and asset allocation, internal firm risk management should then focus on managing systematic risk alone. This is because investors themselves can diversify away firm-specific risk (unsystematic risk) (Crouhy et al., 2006; Belmont, 2004; Doherty, 2000a). Conversely, H_1 attempts to vindicate the notion that ERM implementation is well justified as shareholders are not always well diversified. They are also risk-averse and their interests are well served if firms manage risk on their behalf. This notion of (enterprise) risk management in corporate environment is well supported by Demsetz & Lehn (1985), Smith & Stulz (1985), Mayers & Smith (1982, 1987), Amit & Wernerfelt (1990), Froot, Scharfstein & Stein (1993), Froot & Stein (1996), Tufano (1996, 1998), Smithson (1998), Leland (1998), Cummins et al. (1998).

To validate the value creation theory of the ERM practical framework as depicted in Figure 3.3 above, a structural equation modeling (SEM) has been developed to statistically test the hypothesized causal relationships (structural path), i.e. H_1 and H_2, among the constructs for their strengths and significances. The specified SEM model is made up of the structural and the measurement models. Detailed discussion of these SEM models is presented in the later part of this chapter. From the two general hypotheses, i.e. H_1 and H_2, additional hypotheses which are the subset of H_1 and H_2 have been developed as a result of the three constructs (i.e. Implementation Challenge, ERM Implementation Intensity, and Perceived ERM Benefit Measures) being factor analyzed in the SEM model. Again, the later part of this chapter provides further discussion on this subject.

3.3.2 Hypotheses on Value Maximization Theory of ERM

Neo-classical finance theory (NCFT) postulates that firm will not make any difference in terms of value creation in relation to corporate (enterprise) risk management. However, newer theorists have studied the various reasons and motives for corporate risk management that lead to maximizing shareholders value. Ample literature on risk management has linked the rationale for such initiatives in ensuring business performance. Hypotheses that are mostly being cited in those literature are in the areas of: (i) profit maximization, (ii) financial distress cost, (iii) lowering tax burden, (iv) costly external financing, (v) credit rating, (vi) equity market reward, (vii) informational asymmetries, (viii) agency cost.

3.3.2.1 Cost of Financial Distress and Tax Burdens Hypotheses

Mayers and Smith (1982) justified enterprise risk management by looking into frictional costs that associated with corporate risk. Sibilkov (2009), Nguyen and Faff (2002), Mayer and Smith (1982) believed that risk would tend to increase taxes and would increase the prospective costs of financial distress. Huang and Wang (2009) however found evidence in Chinese listed firms where firms with high distress costs paid little attention to risk management due to bankruptcy protection by local governments. Another primary rationale for the firm to engage in risk management activity is that of reducing expected tax burden (Ramlall, 2010; Morri & Cristanziani, 2009). Evidence on taking position in derivative contracting as the risk management tool to reduce company's expected tax liabilities was more convincing (Cummins et al, 1998). Empirical study by Nance, Smith, and Smithson (1993) reported non-financial companies with higher investment tax credits were more prompt to transact in derivative markets. Cummins, Phillips, and Smith (1997b) also lent evidence to support the tax hypothesis that taxes were a significant determinant for companies to engage in derivative transactions, which is a form of corporate risk management. Based on the above literature, which give rise to the *financial distress cost hypothesis* and *lower tax burdens hypothesis*, this study establishes the following hypotheses:

H_3: *ERM implementation intensity has an effect on reducing cost of financial distress*

H_4: *ERM implementation intensity has an effect on lowering tax burden*

3.3.2.2 Costly External Financing Hypothesis

Numerous studies have lent strong evidence that firms engage in risk management primarily using derivatives as the tool, to ensure the stability of internal funding mechanism through the reduction of income stream variation. This is to ensure that firms have sufficient internal fund to undertake attractive and positive yielding projects. Internal funding is preferred over the external ones because the former is cheaper. These findings are consistent with the *costly external financing hypothesis* which postulates that managers persistently trying to alleviate the need to source costly external funds for taking advantage of investing in profitable projects (Ramlall, 2010; Park & Pincus, 2001; Gay & Nam, 1997; Ahmed, Beatty, & Takeda, 1997; Nance, Smith, & Smithson, 1993; Geczy, Minton, & Schrand, 1977). These arguments lead us to the hypothesis that:

H_5: *ERM implementation intensity has an effect on reducing cost for external financing*

3.3.2.3 Credit Rating Hypothesis

A study by Wall and Pringle (1989) has provided evidence that firms with lower credit ratings are more likely than those with higher rating to use derivative contracts such as swaps for risk management. Other studies such as Puri (2010), Bajaj (2010), Weber et al. (2010) have found that risk management would contribute to better corporate credit ratings. Applying the same concept and motive for enterprise risk management, this study hypothesizes that

H_6: *ERM implementation intensity has an effect on improving firm's credit rating*

3.3.2.4 Equity Market Reward and Informational Asymmetries Hypotheses

Cummins et al (1998) put forth two generic rationales which argue that there may be in shareholders' interest for certain types of enterprises to manage risk. The first rationale is that there may be some risks that are not tradable and the second rationale is that there exist situation in which there are informational differences among owners and managers. The existence of non-tradable risk limits the degree of homemade diversification that shareholders can do for themselves (Smith and Stulz, 1985) whilst informational differences can lead to undervaluation of firms (Froot, Scharfstein, and Stein, 1993), which is obviously not in the interest of the corporation's shareholders (Cummins et al, 1998). The presence of informational friction/asymmetry in the firm will cause even a fundamentally sound firm facing difficulties raising the needed fund when facing temporary distress (Morkoetter & Westerfeld, 2009; Hughes, Liu & Liu, 2007; Froot, Scharfstin & Stein, 1993).

The above arguments give rise to the *equity market reward hypothesis* and the *informational asymmetries hypothesis*. Hence, the following hypotheses are developed:

H_7: *ERM implementation intensity will be rewarded by the equity market*

H_8: *ERM implementation intensity will reduce informational asymmetries in the firm*

3.3.2.5 Agency Problem Hypothesis

Agency theory in financial literature was first presented by Jensen and Meckling (1976). Since then financial economists have examined agency relationships mainly in the context of owners/shareholders versus managers, and shareholders versus creditors (Wu et al., 2007; Dufrene, 1993). Other literature such as He, Mukherjee and Wei (2009), Madura and Nixon (2002), Allen and McConnell (1998) examined the agency problem between self-serving behavior of managers in the parent firms versus their counterparts in the equity carve-out units during corporate restructuring exercises. In the shareholders-creditors agency problem for instance, conflicts of interest between shareholders and creditors bound to happen when firms are facing cash flows problem. Unless constraints are imposed on managerial actions, this incentive conflict can lead to dysfunctional investment decisions (Braun & Latham, 2009; Wu et al., 2007; Cummins et al., 1998).

In the context of corporate risk management, implementation of enterprise risk management can be motivated by managers acting in their own interest rather than those of the shareholders of the firm. Nonetheless this may not come at the expense of the shareholders' interest. Managers have economic incentive to ensure firm continues to do well because they have disproportionately large investments in the forms of their skills or human capital in the firm. It is costly to transfer these skills should they need to seek other work (Cummins et al., 1998). Managers concern about any negative shocks to profits that might result in putting the firm into financial distress or the edge of bankruptcy. Bankruptcy and times of financial distress often lead to replacement of current management. This poses a huge personal risk that cannot be easily diversified by mangers like what shareholders can. As such, in the final analysis, the effect of this managerial motivated risk management effort can actually lead to positive contribution toward the agency conflict in the firms. Hence, the above scenario gives rise to the *agency problem hypothesis*. This study, thus, hypothesizes that

H$_9$: *ERM implementation intensity will reduce agency problem in the firms*

3.3.3 Hypotheses on ERM Value Creation Transmission Mechanism

The theoretical argument of the framework put forth by Chatterjee, Lubatkin, and Schulze (1999) in relation to a strategic conceptualization of risk premium, being referred to as the *CLS risk premium model* in this thesis, suggested that a firm's specific activities in managing its unsystematic risk can have a positive effect on reducing the firm's risk premium. The CLS risk premium model postulated that investors are exposed to various classes of firm-specific risk in a world of partial diversification and imperfect markets. This notion forms the core of our theorized ERM value creation transmission mechanism (see section 2.12). CLS model makes extension to the CAPM notion where apart from recognizing the sensitivity of a firm's expected returns to macroeconomic uncertainties, CLS risk premium model also gives inclusion to the sensitivity of a firm's expected returns to three additional classes of firm-specific risks. CLS risk premium model categorizes these three classes of unsystematic risk as *tactical*, *strategic*, and *normative* risk. Tactical risk exists mainly in information asymmetries. Strategic risk comes from imperfections in the resource and output markets. The normative risk, on the other hand, presents itself in the forces that define institutional norms (Chatterjee et al., 1999).

3.3.3.1 Tactical Risk Hypothesis

The sources of tactical risk presented by various research streams (i.e. earnings management, governance, liquidity, hedging, and real options) have lent support to the argument that some firm-specific activities are relevant to investors and shareholders. The conclusion of which posits that by managing this tactical risk that rooted in informational asymmetries in the market between managers and investors, it will lower the variance of a firm's expected earnings by way of minimizing its earnings surprises. This in turn, will result in investors demanding lower risk premium from the firms (Chatterjee et al., 1999). Owing to this, this study posits the following:

H_{10}: *ERM implementation intensity will reduce firm's tactical risk*

3.3.3.2 Strategic Risk Hypothesis

The nature of strategic risk is due to the uncertain performance outcomes from the firm's committed resources. It is caused mainly by imperfections in resource and output markets (Chatterjee et al., 1999). Thus CLS model defines strategic risk as "the probability that a firm can isolate its earnings from macroeconomic and industry-specific disturbances" (Chatterjee et al., 1999, p.560). Strategy literature provides good accounts for various determinants of strategic risk. These include the firm-structure view, resource-based view, knowledge-based view, and strategic options view.

In summary, based on the above various views (firm-structure, resource-based, knowledge-based, and strategic options) of strategic risk faced by the firms, the CLS risk premium model posits that "investors require a lower risk premium for firms that achieve a degree of isolation from market forces because these firms can offer investors the promise of stable earnings and growth" (Chatterjee at al., 1999, p.560).

H$_{11}$: *ERM implementation intensity will reduce firm's strategic risk*

3.3.3.3 Normative Risk Hypothesis

CLS model posits that risk premium advantages attained through active management of tactical and strategic risks are temporary. Due to competitive forces, any previous advantages will be imitated by competitors and will be neutralized after some time. Tactical and strategic actions will then lose its uniqueness and differentiating factor but become institutionalized and pre-requisites for firm to stay in the industry. Normative risk, thus, is defined as the risk premium (or penalty) that a firm is subjected to if it fails to comply with its institutional norms or rules that it is expected to follow (Graf, 2004; Chatterjee et al., 1999). As in the case of institutional norms and industry rules, firms have to ensure their proper compliances so that to avoid penalty charged onto their risk premium. Based on the above, this study hypothesizes that

H$_{12}$: *ERM implementation intensity will reduce firm's normative risk*

3.3.4 CLS model as Proxy for Cost of Capital

This study adopts the nineteen statements (see items d2 to d20 in *Appendix 2*) measuring up the three classes of firms' unsystematic risks, i.e. tactical, strategic, and normative risks of the CLS risk premium model as a proxy for *cost of capital.* A reduction in the three classes of firms' unsystematic risks as a result of ERM implementation would mean a reduction in firms' risk premium, hence lowering the firms' cost of capital. As such, hypotheses H_{10}, H_{11}, and H_{12} can be rewritten to read:

ERM implementation intensity will lower firms' cost of capital.

The impact of cost of capital for Malaysian public listed companies will be felt when they issue capital instruments such as shares and bonds. The risk premium demanded by the Malaysian capital market for a company's debt instrument such as bond or short-term debt notes is influenced by the recommendation made by rating agencies through the latter's credit profile rating of the formers.

As far as the Malaysian capital market is concerned, the country's central bank or *Bank Negara Malaysia* in May 1991 has made the rating of corporate bonds mandatory in its bid to promote transparency and instill confidence in the country's capital market, especially in the bond market. This development has given birth to the setting up of Rating Agency Malaysia Berhad (RAM), which has since become a premier local credit rating agency in the country (RAM, 2002), for such exercises. As time progresses, the domestic capital market sees the establishment of the second local rating agency, which is the Malaysian Rating Corporation Berhad (MARC).

3.3.4.1 RAM's rating criteria

The analytical framework that RAM uses to analyze Corporate Malaysia's creditworthiness is in tandem with our ERM framework's **CLS risk premium model**. In its credit rating methodology, RAM takes into consideration both quantitative (i.e. financial strength) and qualitative (i.e. management quality and operating environment) factors.

For instance, RAM looks at a firm's (i) **industry risk** (i.e. growth potential, vulnerability to industry factors, barriers to entry); (ii) **business risk** (i.e. *market risk* – basis of competition, market position and size, product/service diversity, customer analysis; *operational risk* – availability of raw materials, efficiency of assets, cost structure, labor relations, credit controls, inventory management); (iii) **financial risk** (i.e. profitability & coverage, funding structure, capital leverage, cashflow stability and adequacy, financial flexibility and liquidity); (iv) **management assessment** (i.e. corporate strategy, risk tolerance, financial policies, succession planning, credibility and integrity; and (v) **diversification factor** (RAM, 2006).

Apart from the above, RAM's credit rating framework also factors in **corporate governance issues** such as management integrity, related-party transactions and disclosure policies (RAM, 2003). RAM's rating scales for a firm's long-term credit profile rating (CPR) range from "AAA-Superior", "AA-Strong", "A-Adequate", "BBB-Moderate", "BB-Fairly Weak", "B-Weak", "C-Very Weak", and "D-Inferior" (RAM,2002).

3.3.4.2 RAM's rating criteria vis-à-vis CLS risk premium model

Note that RAM's rating criteria of *industry, business,* and *management assessment* risks, together with its *diversification factor* mentioned above, have been perfectly captured by the CLS risk premium model's **strategic**[25], **macroeconomic**[26], and **normative**[27] risks. RAM's *financial risk* and *corporate governance issues* on the other hand, have been referred to as **tactical risk**[28] by the CLS model.

3.3.5 Hypotheses in Summary

This study has developed altogether twelve hypotheses for statistical testing of their significances and strengths. Below are all the hypotheses in a glance that have been developed:

H_1: *ERM Implementation Intensity* has a positive effect on *Perceived ERM Benefit Measures*

H_2: *Implementation Challenge* has a negative effect on *ERM Implementation Intensity*

H_3: *ERM implementation has an effect on reducing cost of financial distress*

H_4: *ERM implementation has an effect on lowering tax burden*

H_5: *ERM implementation has an effect on reducing cost for external financing*

H_6: *ERM implementation has an effect on improving firm's credit rating*

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[25] Strategic risk includes firm-structure, resource-based, portfolio of strategic options (diversification, merger and acquisition supply chain integration), and knowledge-based views of risk.
[26] Macroeconomic risk includes market and price risks.
[27] Normative risk includes risk of no-compliance to industry norms.
[28] Tactical risk includes risks of governance, earning management, and liquidity management.

H_7: *ERM implementation will be rewarded by the equity market*

H_8: *ERM implementation will reduce informational asymmetries in the firm*

H_9: *ERM implementation will reduce agency problem in the firms*

H_{10}: *ERM implementation will reduce firm's tactical risk*

H_{11}: *ERM implementation will reduce firm's strategic risk*

H_{12}: *ERM implementation will reduce firm's normative risk*

Hypotheses H_1 and H_2 are to test the validity of the theorized causal relationships among the constructs in our proposed ERM practical framework. Hypotheses H_3 to H_9 are to test the various value maximization theories of ERM. Among them, H_3 to H_7 relate to the cost of capital of the firm. Hypotheses H_{10} to H_{12} are to validate the conceptualization of the strategic risk premium model referred to as the CLS risk premium model in the thesis. The CLS risk premium model forms the conduit through with the value creation transmission mechanism of our proposed ERM framework takes place. This value creation transmission mechanism, which conceptually connects the ERM practical framework to the end outcome of shareholders value creation, completes the overall conceptual framework for our advocated value-enhancing ERM model. Collectively, the testing of hypotheses H_1 to H_{12} represents this study's attempt to substantiate the overall conceptual framework for a value enhancing ERM framework as depicted in Figure 3.2.

3.4 THE RESEARCH DESIGN

According to Malhortra (2004), the design of any research can be broadly classified as either an *exploratory* or as a *conclusive* one. In principle, an exploratory research is conducted primarily to provide insights into, and understandings of, the problem situation confronting the researcher. On the other hand, a conclusive research is designed to test specific hypotheses and examine relationships in order to assist the decision maker in determining, evaluating, and selecting the best course of action to take in a given situation. As for the latter research design, the information needed is clearly defined and the process is formal and structured (Shukla, 2009; Malhortra, 2004).

Malhotra (2004) further classifies conclusive research designs into two categories, namely *descriptive* or *causal*. The descriptive type of research design is used to describe market characteristics or functions whilst the causal one is undertaken to determine cause and effect relationships (Shukla, 2009). As for this study, the research design can be described as to embody both the descriptive as well as the causal ones. For instance, the research design is based on a *descriptive* research whose cross-sectional primary (survey) data is subjected to quantitative analysis. Apart from that, the hypotheses that are being developed are also subject to statistical tests using *causal* research methods.

To illustrate further, this study's conclusive research lies in the form of a descriptive cross-sectional survey which was conducted to qualify and quantify how implementation intensity of enterprise risk management will benefit companies, hence the underlying causal relationship. This research also aims to determine the relative salience of the factors of implementation challenge towards ERM implementation intensity. These factors of implementation challenge are identified through a exploratory research.

Thus, this research design encompasses both the exploratory and conclusive ones. In addition, it also covers both the descriptive and causal types. As such, the classification for this research design is not suitably being referred exclusively to just a particular type, but rather a hybrid of a several categories.

3.5 THE POPULATION

The target population for this research is the companies listed on the Malaysian stock market (Bursa Malaysia), or simply the public listed companies (PLCs). PLCs are chosen for this study because compared to non-listed firms, they are more aware and sensitive to the need for formalizing risk management program within the enterprise. This is due to the fact that as public listed entities, PLCs are subjected to statutory regulation from the Securities Commission, market regulation from the Bursa Malaysia, and face more pressure to impose self-regulation for corporate best practices of good governance from the shareholders and interest groups such as that of Minority Shareholders Watchdog Group (MSWG)[29]. The research elements[30] (respondents of survey) on the other hand, are the public listed companies' senior officials who are in-charge of the firms' ERM program. These senior officials include chief executive officer (CEO), managing director (MD), chief risk officer (CRO), chief financial officer (CFO), general manager (GM),

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[29] MSWG is a shareholders activism organization whose primary objectives are to promote corporate governance and to protect minority shareholders interests by sustaining shareholder value in companies through engagement with relevant stakeholders.

[30] "An element is the object about which or from which the information is desired. In survey research, the element is usually the respondent" (Malhotra, 2004: 315).

senior manager, and manager of the firms. Questionnaires are sent to all PLCs with attention to these officials for their responses of agreement for the various statements presented in the questionnaires in relation to their firms' ERM program. As of June 2009, there were a total of 960 companies listed on the Bursa Malaysia.[31]

3.6 THE SAMPLING FRAME AND SAMPLING SIZE

The sampling frame consisted of 960 elements[32] (public companies listed on Bursa Malaysia). The sampling frame is a list of all public listed companies' correspondence contact details provided by the Bursa Malaysia. As such, this sampling frame of 960 elements also represents the target population under study. The number of elements required was initially kept at 400. This number represents a sampling rate of 42 percent against that of the population under study. By a convention standard of sampling size determination, this sampling rate was considered to be acceptable (Malhotra, 2004, p.318). This required sampling elements of 400 was decided upon in view of the fact that a higher number of elements tends to increase the probability of misrepresentation of the survey population (Babbie, 1990; Khong & Richardson, 2003). The decision was also made based on the analytic model using structural equation modeling (SEM). The analytical method and statistical procedure performed for data analysis using SEM are discussed in detail in section 3.8 and Chapter 4. Referring to this type of analytic model that employs SEM, Hair et al. (1998, p.605) suggested that the lower limit of the required elements in a sampling frame should be between 100 and 150. As such,

[31] Source: Bursa's Bulletin "BursaBytes", Issue 2, Vol 1, July 2009.
[32] Based on the Bursa Malaysia's bulletin, "BursaBytes", Issue 2, Vol 1, July 2009.

the data collection process was aimed at obtaining returned questionnaires of at least 100, hence meeting the minimum threshold of the data analysis requirement.

3.6.1 The Stratified Sampling Method

This study adopted a probability sampling technique called the *stratified sampling* technique. Stratified sampling "is a two-step process in which the population is partitioned into sub-populations, or strata" (Malhotra, 2004, p.327). The criterion, or stratification variable, that was used to stratify the sample was the market capitalization of the PLCs. Market capitalization is defined as the total market share value of the PLCs. The value was computed by multiplying the share price with the total common share outstanding of the PLCs. Under this stratification condition, the PLCs in the Bursa Malaysia were divided into two sub-groups, or stratums. The first stratum was the top 100 companies with the largest market capitalization listed on the Bursa Malaysia. The second stratum was the remaining PLCs. This also means that the required sampling elements of 400 were thus divided into 100 elements for the first stratum and 300 elements for the second stratum. The largest PLCs by market capitalization of the top 100 were chosen to be in the first stratum because until 6 July 2009, these top 100 PLCs by market capitalization were the component stocks in the Bursa Malaysia's Kuala Lumpur Composite Index, or popularly known as the KLCI. KLCI was the market barometer index whose daily movement was used as the proxy for the entire stock market performance for Malaysia then. The 100-stock KLSE index's computation was replaced by the 30-

stock FTSE[33] Bursa Malaysia KLCI on 6 July 2009 which adopts the FTSE global index standard.

The main reasons for using stratified sampling were "to increase precision without increasing cost" and to obtain greater "effectiveness in controlling extraneous sampling variation" (Malhotra, 2004, p.327). For instance, by targeting the top ranking PLCs by market capitalization in the survey, the study practically believes that more information were available for extraction due to the fact that the chances are higher for this cluster of the PLCs having instituted proper and formal ERM programs. In the same light, the chances were also higher that this stratum of PLCs would have gained more experiences in terms of their own ERM implementation processes as well as their ERM outcomes. Table 3.1 presents the summary of the sampling design.

[33] FTSE is an independent company jointly owned by The Financial Times and the London Stock Exchange. FTSE indices are used extensively by a range of investors such as consultants, asset owners, fund managers, investment banks, stock exchanges and brokers.

Table 3.1: Summary of the Sampling Design

Target population	All public listed companies (PLCs) on the Malaysian stock market (Bursa Malaysia)
Sampling frame	Correspondence list of public listed companies provided by Bursa Malaysia
Sampling technique	Stratified sampling by market capitalization with 2 stratums (i.e. stratum1: top-100 largest PLCs by market capitalization; stratum 2: the remaining PLCs)
Sample size	400 (100 for stratum 1 and 300 for stratum 2)
Execution	Allocate sample by strata, select random company name from list for stratum 2 (cover the entire elements for stratum 1), initiate contact through phone calls or emails, send questionnaires to those agree to participate in the survey

3.7 CONSTRUCTS MEASUREMENT AND VARIABLES SCALE

There are three constructs involved in the practical framework as depicted in Figure 3.4. They are (i) *ERM Implementation Challenge*, (ii) *ERM Implementation Intensity*, and (iii) *Perceived ERM Benefit Measures*. The measurement scale for each construct is based on theories and concepts found in relevant literatures as below.

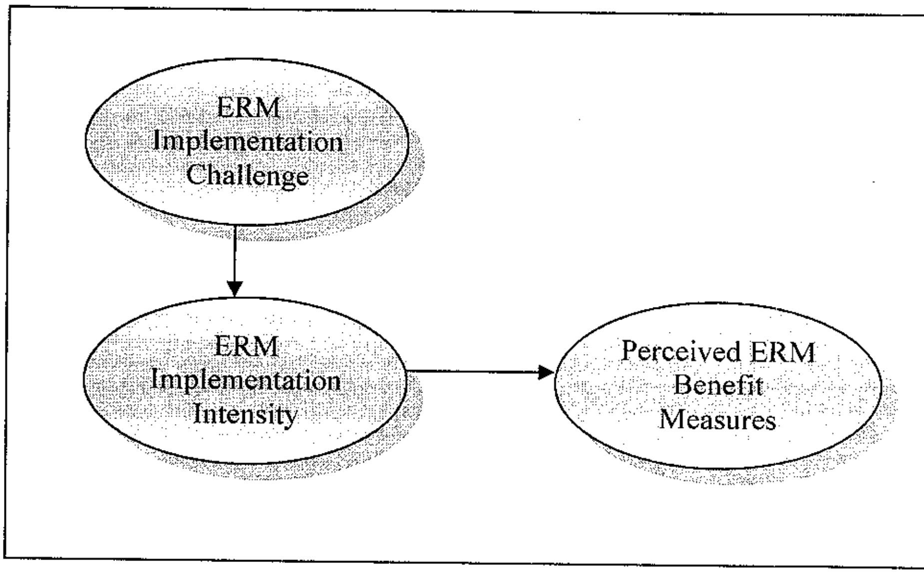


Figure 3.4: Constructs of the Practical Framework

3.7.1 ERM Implementation Intensity

The construct ERM Implementation Intensity is measured by a measurement metric made up of survey statements presented to respondents for their assessment. These survey statements come in the form of 5-point Likert's scale covering three key dimensions of enterprise risk management framework, namely the *process*, *governance*, and *structure*. There are fourteen statements in the questionnaire relating to various ERM elements found in the firm, proxying the ERM implementation intensity. The statements gauge respondent's agreement ratings in regard to the description of various elements found in, or impacts resulted, from the respondent's corporate risk management (CRM) or ERM process. They are to be used as proxy in determining the effective implementation of the firm's ERM program.

The statements are (whether CRM or ERM): (1) provides common understanding of the objectives of each CRM initiative, (2) provides common terminology and set of standards of risk management, (3) provides enterprise-wide information about risk, (4) Integrates risk with corporate strategic planning, (5) Reduces risk of non-compliance, (6) Enables tracking costs of compliance, (7) Quantifies risk to the greatest extent possible, (8) Integrated across all functions and business units, (9) Enables everyone to understand his/her accountability, (10) CRM strategy is aligned with corporate strategy, (11) Identifies key risk indicators (KRIs), (12) Integrates risk with key performance indicators (KPIs), (13) Aligns CRM initiatives to business objectives, (14) Provides the rigor to identify and select risk responses (i.e. risk- avoidance, reduction, sharing and acceptance). The statements above take reference from the COSO ERM guideline, the Pricewaterhouse-Cooper's 7th annual global CEO survey on ERM, and other literature on ERM practices discussed in Chapter 2.

3.7.2 Statements for Construct 'ERM Implementation Intensity' Explained

3.7.2.1 ERM definition

These fourteen statements are deemed to be important and relevant for respondents' evaluation. This is because they indicate the defining description of the intensity, maturity, and the penetration level of ERM practices existed in the respondents' corporations. For instance, it has been frequently mentioned in most of ERM literature (Bailey et al., 2004; Kalita, 2004; Chapman, 2003; Hermanson, 2003; Kloman, 2003; Libenbereg et al., 2003) that one of the forefront challenges of ERM implementation is to define what ERM really means to corporation. In the absence of standard definition for the meanings of the various terms used in ERM initiatives and without the provision of a precious goal for its implementation, it is difficult to envisage a successful implementation of ERM program. Hence, the inclusion of statements (1) and (2) in the questionnaire is to capture this essence.

3.7.2.2 Effective communication of risk and responsibilities

Besides, enterprise-wide risk management initiatives can only be successfully implemented if everyone in the organization is clear about the type and nature of risk relevant to the enterprise. Thus, all pertinent information about the existing and potential risk faced by the enterprise must be effectively disseminated. Channel of communication must be open to facilitate top-down and bottom-up communication taking place to ensure all members of the firm understand their roles and responsibility in regard to the risk (COSO, 2004; Chapman, 2003). The inclusion of statement (3) and (9) is to serve this end.

3.7.2.3 Philosophy of ERM

Statements (4), (8), (10), and (13) are included to capture the philosophy of ERM program. The essence and the very notion of ERM implementation are to integrate risk with business objectives and to align risk management initiatives with the overall corporate strategy in order to attain competitive advantages. This alignment and integration of risk must pervasively envelop all business units in the firm (Bailey et al., 2004; Lam, 2003; Hermanson, 2003; Chapman, 2003; Culp, 2001).

3.7.2.4 Risk identification and response

Statement (14) relates to ERM providing rigor to enterprise to enhance its capability in identifying and selecting among alternative risk responses. The responses include risk avoidance, reduction, sharing and acceptance. The ability and efficiency of a firm to identify risk and subsequently respond to it are elements which are integral to an effective corporate risk management program (Bierc, 2003).

3.7.2.5 Compliance cost

In the enterprise's day-to-day operating environment, among the many business objectives, one of them more often than not, involves a compliance objective to the applicable laws and regulations. This objective is especially apparent in highly regulated industries such as the finance, banking, gaming, and public utilities sectors. Besides, compliance can also relate to meeting firms' internal corporate governance requirements. Owing to this, the cost incurred in such compliance initiatives can make up a significant chunk of the overall business operating cost. Hence, the inclusion of statements (5) and (6) in the questionnaire gauges how far ERM enables the management to track such compliance cost and the risk of non-compliance.

3.7.2.6 Risk quantification

Statement (7) relates to risk quantification. Before any specific response in regard to risk can be undertaken, enterprise needs to quantify them. Most of the quantification processes will involve the conversion of calculated risk into currency denomination. This is to provide a precise perspective to facilitate decision rule in the light of potential loss or damages in monetary terms before any response decision is made.

3.7.2.7 Performance measurement

Statements (11) and (12) relate to performance measurement. The underpinning philosophy of implementing ERM program is to transform the entire organization to an enterprise that is internalized with "risk-aware" culture. To this end, it is imperative to identify key risk indicators (KRI) relevant to the firm's business and to tie those KRIs to staff members' key performance indicators (KPI). These KRIs and KPIs will enhance the firm's focus on balanced risk-reward trade-offs by effectively rewarding people for taking smarter risks (Bailey et al., 2004; Rucker, 2002).

Table 3.2 summarizes the three dimensions of ERM implementation framework, i.e. *structure*, *governance*, and *process*, with their corresponding questionnaire statements and item codes covering the various areas within each ERM dimension.

Table 3.2: Dimensions and Areas of ERM Implementation Framework

Dimension	Area	Item	Statement
Structure	ERM Definition	i1	provides common understanding of the objectives of each CRM initiative
		i2	provides common terminology and set of standards of risk management
	Performance measurement	i11	Identifies key risk indicators (KRIs)
		i12	Integrates risk with key performance indicators (KPIs)
Governance	Information and roles	i3	provides enterprise-wide information about risk
		i9	Enables everyone to understand his/her accountability
	Compliance	i5	Reduces risk of non-compliance
		i6	Enables tracking costs of compliance
Process	Integration of business strategy and objectives	i4	Integrates risk with corporate strategic planning
		i8	Integrated across all functions and business units
		i10	CRM strategy is aligned with corporate strategy
		i13	Aligns CRM initiatives to business objectives
	Risk identification and response	i14	Provides the rigor to identify and select risk responses (i.e. risk- avoidance, reduction, sharing and acceptance)
	Risk quantification	i7	Quantifies risk to the greatest extent possible

3.7.3 Statements for Construct 'Perceived ERM Benefit Measures' Explained

The second construct in the practical framework is *Perceived ERM Benefit Measures*. This perceived ERM benefit measures can also be interpreted as the *outcome* derived from implementing ERM program. It can also be viewed as the *motives* for firms to engage in enterprise risk management program.

There are twenty statements presented to respondents for their agreement assessment in a 5-point Likert's scale format. The statements are as follows (CRM or ERM): (1) enhances enterprise's ability to take appropriate risks in value creation, (2) strengthens management's confidence in business operations, (3) creates smooth governance procedures, (4) improves monitoring of enterprise performance, (5) enriches corporate reputation, (6) improves clarity of organization-wide decision-making and chain of command, (7) facilitates reporting to regulators, (8) improves communicating to stakeholders / shareholders, (9) enhances managers' ability to think entrepreneurially and innovatively, (10) boosts enterprise's profitability, (11) assists in meeting enterprise's strategic goals, (12) reduces expected costs of financial distress, (13) protects company's investments, (14) reduces volatility of managers' bonuses and salaries, (15) reduces informational gap (asymmetries) between management and shareholders, (16) Managers are risk conscious , (17) CRM implementation has a positive impact on enterprise's credit rating, (18) CRM helps our enterprise to be respected within the industry, (19) CRM can minimize agency problem/cost, (20) Implementing CRM program will be rewarded by the equity market.

These statements are drawn from the (i) *CLS risk premium model* as has been discussed extensively in Chapter 3; (ii) PricewaterhouseCooper's 7th Annual Global CEO Survey on ERM; (iii) COSO framework of ERM; and (iv) literature on the motives for corporate risk management such as those of Belmont (2004); Doherty (2000); Cummins et al. (1998); Cummins, Phillips, and Smith (1997b); Ahmed, Beatty, and Takeda (1997); Tufano (1996); Nance, Smith, and Smithson (1993); Nance, Smith, and Smithson (1993); Mayers and Smith (1982). These literatures among others, touch on financial distress cost hypothesis, costly external financing hypothesis, informational asymmetries hypothesis, and corporate tax minimization hypothesis.[34]

For instance, the CLS risk premium model posits that apart from macroeconomic risk, a firm's expected returns are also sensitive to *tactical*, *strategic*, and *normative* risks, hence affecting its risk premium. Tactical, strategic, and normative risks are classes of firm-specific risk defined by the CLS risk premium model. Thus, it follows that the outcomes of managing these risks are to lower investors' expectation on the firm's risk premium. In this light, statements (3), (7), and (8) relate to the governance aspect of the tactical risk whilst statements (4), (10), (12), (13), and (14) relate to the earning-liquidity management of the tactical risk. Statements (5), (6), and (9) relate to the firm-structure view of the strategic risk whilst statements (1), (2), and (16) relate to the knowledge-based view of the strategic risk. Statements (11) and (15) reflect the overall management of strategic risk and tactical risk respectively whilst statements (7) relate to the normative risk of the firm.

3.7.4 Statement for Construct 'ERM Implementation Challenge' Explained

The third construct in the practical framework as depicted in Figure 3.4 involves *ERM Implementation Challenge*. This construct is proxied by nine statements measured in 5-point Likert's scale presented to respondents for their agreement rating in regard to the challenges faced during ERM implementation process. This construct is presented to the practical framework as a factor to

[34] See section 2.3 and 2.4 in Chapter 2.

potentially affect *ERM implementation intensity* construct. The construct attempts to highlight the fact that various challenges faced by a firm during ERM implementation will affect its implementation intensity and hence, its outcomes or success, i.e. perceived ERM benefit measures. These implementation challenges can be attributed to such limitations and constraints as in the areas of *organizational structure*, *financial* and *human resources*, *information technology infrastructure*, and *expertise*. ERM implementation should be seen as a program within a broader context of business process reengineering (BPR) and organizational change. Hence, the nine statements measuring *ERM challenges* construct are drawn from strategy, BPR, and change management literature such as those of Graf (2004), Khong & Richardson (2003), and Grover et al. (1995). These nine statements are: (1) people is an area posing big challenge, (2) timeliness of information is a problem, (3) there is lack of information needed, (4) over-regulation in organization hinder ERM implementation, (5) there is strong competition from other type of management techniques to be implemented, (6) there is wide discrepancy between expectation and practices in ERM implementation, (7) there is inadequate technology support (i.e. installation of information technology system for risk identification and assessment), (8) the organization structure deters ERM implementation, (9) there is insufficient necessary level of investment for ERM implementation.

3.7.5 *Statements for Variables Measuring Various ERM Value Maximization Theories*

Unlike the multiple statements contained in the questionnaire that are used to measure each of the three constructs in the proposed ERM implementation (practical) framework as mentioned above, only a single statement representing an individual variable is used to test each of the various value maximization theories of ERM respectively. These statements are presented to the respondents for their agreement assessment in a 5-point Likert's scale format. The statements describe the outcomes of risk management processes. Based on their understanding and experiences in regard to the enterprise risk management implementation processes, the respondents are expected to rate their agreement to each of the outcome as a result of ERM implementation. The statements which correspond to their respective hypotheses are presented below.

3.7.5.1 Statement for Cost of Financial Distress Hypothesis

For the cost of financial distress hypothesis, which reads,

H_3: ERM implementation has an effect on reducing cost of financial distress,

the corresponding statement that is presented to respondents is worded as follows:

ERM can minimize cost of financial distress

3.7.5.2 Statement for Lower Tax Burden Hypothesis

To test the hypothesis for the lower tax burden, which reads,

H_4: ERM implementation has an effect on lowering tax burden,

the corresponding statement that is presented to respondents is worded as follows:

ERM can lower tax burden

3.7.5.3 Statement for Cost for External Financing Hypothesis

To test the hypothesis for the cost for external financing, which reads,

H_5: ERM implementation has an effect on reducing cost for external financing,

the corresponding statement that is presented to respondents is worded as follows:

ERM can avoid costly external financing

3.7.5.4 Statement for Firm's Credit Rating Hypothesis

To test the hypothesis for the firm's credit rating, which reads,

H_6: ERM implementation has an effect on improving firm's credit rating,

the corresponding statement that is presented to respondents is worded as follows:

ERM implementation has a positive impact on enterprise's credit rating

3.7.5.5 Statement for Equity Market Reward Hypothesis

To test the hypothesis for the equity market reward, which reads,

H_7: ERM implementation will be rewarded by the equity market,

the corresponding statement that is presented to respondents is worded as follows:

Implementing ERM program will be rewarded by the equity market

3.7.5.6 Statement for Informational Asymmetries Hypothesis

To test the hypothesis for the informational asymmetries, which reads,

H_8: ERM implementation will reduce informational asymmetries in the firm,

the corresponding statement that is presented to respondents is worded as follows:

ERM helps reduce information gap between managers and investors

3.7.5.7 Statement for Agency Problem Hypothesis

To test the hypothesis for the agency problem, which reads,

H_9: ERM implementation will reduce agency problem in the firms,

the corresponding statement that is presented to respondents is worded as follows:

ERM implementation will reduce volatility of managers' bonuses and salaries

3.7.6 Statements for the CLS Risk Premium Model Constructs

Similar to the hypotheses testing on the ERM implementation (practical) framework which involves three constructs in the framework, the hypotheses testing on the CSL risk premium model also involves three constructs, i.e. *tactical risk*, *strategic risk*, and *normative risk*. The measurement for each of these three constructs is based on multiple statements contained in the questionnaire. These statements are presented to the respondents for their agreement assessment in a 5-point Likert's scale format. The respondents are expected to rate in regard to the cited situations that have transpired in their firms. The statements which correspond to their respective hypotheses are presented below.

3.7.6.1 Statement for Tactical Risk Hypothesis

To test the hypothesis for the tactical risk in the CLS risk premium model, which reads,

H_{10}: ERM implementation will reduce firm's tactical risk,

the construct *tactical risk* is measured by five statements. The six statements are **(1)** there is a minimum information friction (gap) between the management and the shareholders, **(2)** there is a minimum gap of risk preference between the management and shareholders of firm's investment undertaking, **(3)** there is a satisfactory liquidity/free float of firm's shares traded in the stock exchange, **(4)** company uses hedging strategy heavily, **(5)** hedging strategy employed by firm is effective in meeting its intended objectives, and **(6)** the use of real options to reduce firm's earning surprises is effective and satisfactory.

Referring to the above, statement (1) is derived from the information (asymmetries) management literature, statement (2) is from the governance management literature, statement (3) is from the liquidity management literature, statements (4) and (5) are from the hedging literature and statement (6) is from the real options literature. The hedging and real options literatures are subsets of the earnings management literature (see section 2.10.2).

3.7.6.2 Statement for Strategic Risk Hypothesis

To test the hypothesis for the strategic risk in the CLS risk premium model, which reads,

H_{11}: ERM implementation will reduce firm's strategic risk,

the construct *strategic risk* is measured by nine statements. The nine statements are **(1)** management is effective in isolating firm's earnings from market forces/uncertainty, **(2)** management is effective in shaping the firm to attain and sustain its structural advantages, **(3)** management is effective in isolating its earnings from rivals attacks through attaining structural advantages, **(4)** our enterprise has attained resource-based advantages, **(5)** our enterprise's resource-based advantages have helped isolate it from market pressures, **(6)** our enterprise has attained knowledge-based advantage (i.e. attain superior information from competitors regarding market situation and resources to protect earnings fluctuation), **(7)** our firm is able to absorb, interpret, and commercialize critical information on a timely basis which has helped to isolate its earnings from rival attack, market pressure, and technological obsolescence, **(8)** our firm has attained strategic options advantages (i.e. ability to diversify business line, expand market reach and product offering, acquire key supplier), and **(9)** our firm possesses a portfolio of strategic options (i.e. ability to diversify business line, expand market reach and product offering, acquire key supplier) which has enabled it to mitigate macroeconomic and industry disturbances risk.

Referring to the above, statement (1) is derived from the literature on earnings shock isolation argument, statements (2) and (3) are from the firm-structure view literature, statements (4) and (5) are from the resource-based view literature, statements (6) and (7) are from the knowledge-based view literature, and statements (8) and (9) are sourced from the strategic options view literature (see section 2.10.3).

3.7.6.3 Statement for Normative Risk Hypothesis

To test the hypothesis for the strategic risk in the CLS risk premium model, which reads,

H_{12}: ERM implementation will reduce firm's normative risk,

the construct *normative risk* is measured by four statements. The four statements are **(1)** our enterprise is successful in complying with industry and regulatory rules, **(2)** our firm will face higher risk premium if we fail to comply with industry or institutional norms (i.e. those market rules expected by investors, regulators, interest groups), **(3)** our firm's competitive advantages achieved through implementing strategic risk management (i.e. structure, resource, knowledge advantages) will be quickly matched by our competitors, and **(4)** our firm's competitive advantages achieved through implementing tactical risk management (i.e. hedging and options) will be quickly matched by our competitors.

Referring to the above, statements (1) and (2) are derived from the literature on norms violation penalty argument, statements (3) and (4) are sourced from the literature on diminishing competitive advantages argument (see section 2.10.4).

3.7.7 Statement for ERM Implementation

We have discussed in sections 3.7.5 through 3.7.6 above on the definition or measurement statements on the respective dependent variables for the various cited hypotheses to be tested, i.e. H_3 to H_{12}. These hypotheses share a common independent variable (construct), namely the *ERM Implementation.* As for the measurement of this construct (ERM Implementation), we proxy it by adopting the

ERM Implementation Intensity construct as in the ERM practical framework defined in sections 3.7.1 - 3.7.2.

To recapitulate, the construct *ERM Implementation Intensity* is measured by a measurement metric made up of survey statements presented to respondents for their assessment. These survey statements come in the form of 5-point Likert's scale covering three key dimensions of enterprise risk management framework namely the *process*, *governance*, and *structure*. There are fourteen statements in the questionnaire relating to various ERM elements found in the firm, proxying the ERM implementation intensity (see section 3.7.1 for the description of the fourteen statements and see sections 3.7.2.1 - 3.7.2.7 for the theoretical underpinning for each of the fourteen statements). The statements gauge respondent's agreement ratings in regard to the description of various elements found in, or impacts resulted, from the respondent's ERM process.

3.8 THE ANALYTICAL MODEL OF THE ERM PRACTICAL FRAMEWORK

This section and the sections that follow (sections 3.9 - 3.13) describe the analytical model, i.e. the statistical procedures and measures used to find causal relationships between the constructs of the ERM practical framework, namely *ERM Implementation Intensity*, *Perceived ERM Benefit Measures*, and *Implementation Challenge* (see Figure 3.4). Below depicts in chronological order, the procedures and measures that have been performed:

(i) Reliability analysis using SPSS:

- Cronbach's alpha

- Item-total correlation

(ii) Exploratory factor analysis using SPSS:

- Principal component extraction with Varimax rotation method

(iii) Confirmatory factor analysis

(iv) Second-Order Factor Analysis Model

(v) Modeling and hypothesis testing using SPSS AMOS, a statistical software used for the following objectives:

- Developing theoretically based model
- Constructing a path diagram of causal relationships
- Converting the path diagram into a set of structural and measurement models
- Choosing the input matrix type and estimating the proposed model
- Assessing the identification of the structural model
- Evaluating goodness-of-fit criteria
- Interpreting and modifying the model

3.9 RELIABILITY ANALYSIS

3.9.1 Introductory

Reliability is the "extent to which a variable or set of variables is consistent in what it is intended to measure" (Hair et al., 1998, p 90). In the context of creating a summated scale, which is done by adding up several individual variables into a single composite or sum measure, reliability test is "an assessment of the degree of consistency between multiple measurements of a variable" (Hair et al., 1998, p 117). The benefit of creating a summated scale (to become one variable) from several variables is to achieve data reduction purpose (Hair et al., 1998). For instance, 'Quantifies risk to the greatest extent possible' and 'Integrate risk management across all functions and business units' are variables that measure 'ERM Implementation Intensity'. If these two variables are reliable, they measure the true value of 'ERM Implementation Intensity' and their measurement will be consistent and error free (Hair et al., 1998; Khong & Richardson, 2003). For example, consistent values underlie a common response towards how 'Quantifies risk to the greatest extent possible' and 'Integrate risk management across all functions and business units' can affect 'ERM Implementation Intensity'. If reliability of some observed variables cannot be established, their measures on a construct will be erratic (Khong & Richardson, 2003; Hair et al., 1998).

Reliability analysis ought to be performed to ensure consistent data results before further multivariate analysis to be conducted. This analysis evaluates the reliability of the survey instrument; i.e. the questionnaire (Khong and Richardson, 2003). Reliability analysis can take two forms. They are the test-retest and internal consistency (Hair et al., 1998). According the Hair et al. (1998), the test-retest reliability analysis is used to measure consistency between responses for a respondent in different point in time. On the other hand, the internal consistency reliability analysis is for consistency among the variables in a summated scale. According to Hair et al. (1998), the internal consistency is more commonly used measure of reliability test. High internal consistency reliability shows that items measuring the same scale (construct) are highly intercorrelated (Hair et al., 1998; Khong & Richardson, 2003).

3.9.2 Cronbach's Alpha

Cronbach's alpha is a commonly used technique to measure internal consistency (Hair et al., 1998; Khong & Richardson, 2003). The Cronbach's alpha values range from 0 and 1.0 (Hair et al., 1998). The higher values indicate higher degrees of homogeneity among items measuring a scale (Hair et al., 1998; Khong & Richardson, 2003). In our context, the Cronbach's alpha values gauge if the questionnaire measures the 'ERM implementation intensity', 'perceived ERM benefit measures', and the 'implementation challenge' in a useful manner. It also gauges the extent of intercorrelation among items (inter-item correlations) within a scale/construct. Items with low Cronbach's alpha values will be omitted for further analysis to improve reliability of the scale. A rule of thumb suggests that acceptable Cronbach's alpha values should exceed 0.7 (Hair et al., 1998; Khong & Richardson, 2003).

3.9.3 Item-Total Correlation

Item-total correlation measures "the correlation of the item to the summated scale score" (Hair et al, 1998, p 118). It was used to gauge the relationship of one variable with the rest in the set of measures or scale. In other words, the test provided information whether the variables share a common core in measuring up a scale/construct. Variables with unsatisfactory item-total correlation score were discarded for further analysis to ensure high reliability of the scale or construct. A rule of thumb suggests that acceptable item-total correlation value should exceed 0.5 (Hair et al, 1998, p 118).

Reliability analysis was performed using SPSS program. The derivation and interpretation of the SPSS output were based on the default settings recommended by the SPSS Application Guide (Anon, 1999; Khong & Richardson, 2003).

3.10 EXPLORATORY FACTOR ANALYSIS

As Arnau (1998) described, factor analysis deals with extraction of factors from a matrix of associations between variables under study. According to Hair et al. (1998, p 580), exploratory factor analysis (EFA) investigates "possible relationships in only the most general form and then allows the multivariate technique to estimate relationships". EFA is performed to establish a factor model from a set of variables to identify the underlying "structure of relationships between either variables or respondents" (Hair et al., 1998, p 95) without setting a preconceived structure on the outcome (Suhr, 2009). This is done by investigating the correlations matrix or variance-covariance matrix between the variables and the respondents (Hair et al., 1998, p.95; Arnau,1998). A factor model enables researchers to reduce the many variables to a more manageable, smaller set of new, composite dimensions or variates (factors) with a minimum loss of information (Hair et al., 1998; Khong & Richardson, 2003). In EFA, no constraints will be set on the variable loadings in order to let "the method and the data define the nature of the relationships" (Hair et al., 1998, p 580). In a nutshell, EFA is performed for summarizing the data and reducing it.

3.11 CONFIRMATORY FACTOR ANALYSIS

Confirmatory factor analysis (CFA) is a special form of factor analysis used to verify the factor structure of a set of observed variables (Suhr, 2009). It is used to examine the number of factors and the loadings of variables. Opposite to exploratory factor analysis (EFA), where all loadings are free to vary, CFA allows for the explicit constraint of certain loadings to be zero, hence total control of which variables describe the factor (Hair et al., 1998; Khong & Richardson, 2003). CFA is performed to analyze construct validity and to establish the measurement model in Structural Equation Modeling (SEM) analysis. It is used in the third step of SEM, i.e. converting the path diagrams into a set of measurement model (Hair et al, 1998, p 581; Khong & Richardson 2003). CFA allows the researcher to test hypothesis of a significant relationship between observed variables and their underlying latent constructs (Suhr, 2009).

3.12 SECOND-ORDER FACTOR ANALYSIS MODELS

The primary goal of performing factor analysis is to "summarize data so that the empirical relationships can be grasped by the human mind" (Gorsuch, 1983, p.2; Arnau, 1998). This is done by identifying the underlying factor structure among the variables under study (Hair et al., 1998; Suhr, 2009). After extraction, one of the many available rotation procedures available can be performed on the factors. This is done by redistributing the "variance contributed by the variables to the factors in a way that yields a more understandable structure" (Arnau, 1998, p.4). Arnau (1998) pointed out that if an oblique rotation is used, this will result in factors that are themselves correlated. Hence, there would be a factor correlation matrix where by itself, could be factor analyzed. The factors that are extracted from such an analysis are called "higher-order" or "second-order" factors (Arnau, 1998).

In comparison, the factor analysis models (EFA and CFA) which have been discussed earlier are known as *first-order factor models* (Hair et al., 1998). In the discussion of the CFA model in section 3.11, only one level of factors (the first order) that are correlated is specified by the researcher. The researcher assumes that the factors, albeit correlated, are separate constructs (Hair et al., 1998, p 625). It may happen that a particular construct has several facets or dimensions. In our context, examples are such as *ERM implementation intensity*, *perceived ERM benefit measures*, and *implementation challenge*. In such cases, it is imperative for the researcher to demonstrate the structural relationships between the facets and dimensions of these constructs, hence specifying the second-order structural relationship for the respective construct. Specifying this second-order structural relationship would enable the researcher to provide a stronger statement in terms of the dimensionality of the constructs under study, e.g. ERM implementation intensity, perceived ERM benefit measures, and implementation challenge (Hair et al., 1998).

According to Hair et al. (1998), the second-order factor model has two unique characteristics. One of them is that the second-order factor becomes the exogenous construct, whilst the first-order factors are endogenous. This means that "the second-order factor "causes" the first-order factors" (Hair et al., 1998, p.626). Hair et al. (1998) also noted that the second unique characteristic of the second-order factor model is that the second-order factor is completely latent, hence it does not possess any indicator.

For instance, we can further hypothesize that the construct *ERM implementation intensity* possesses three dimensions or facets, e.g. *governance*, *structure*, and *process*. Under this circumstance, we can develop a three-factor model (first-order) for this particular construct. The specification of the structural relationships between this three-factor model with the construct itself, i.e. *ERM implementation intensity*, is identified as the second-order factor model. Figure 3.5 portrays this second-order model for the construct *ERM implementation intensity* in which each of the first-order factors, i.e. *governance*, *structure*, and *process* are now related in (or arise from) the second-order factor (Hair et al., 1998).

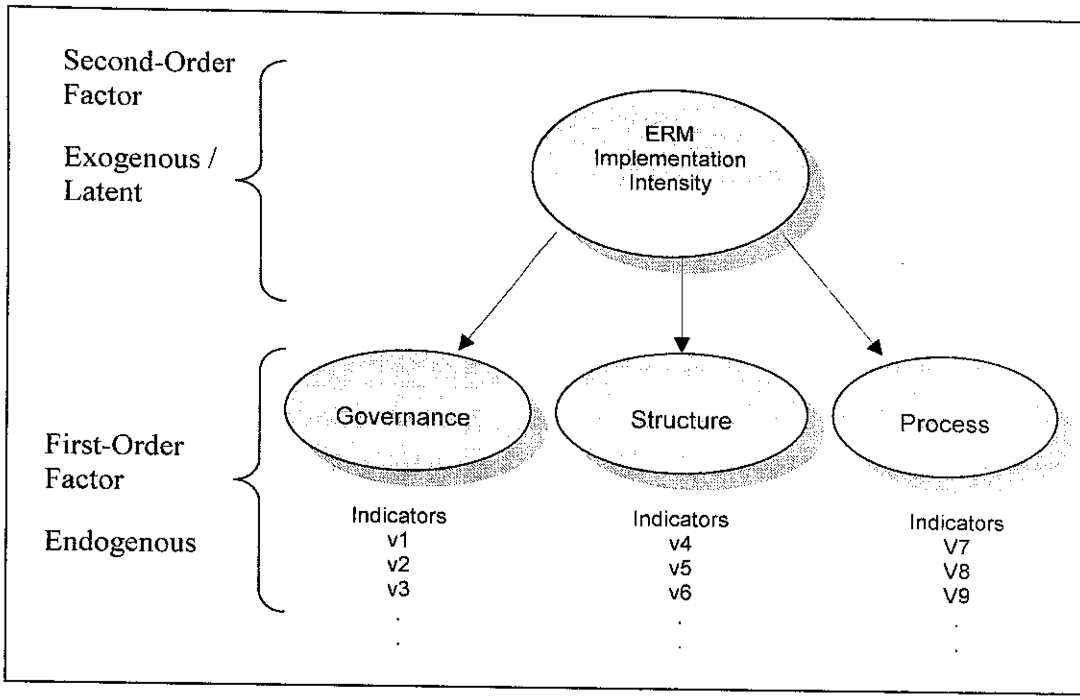


Figure 3.5: Path Diagram of Second-Order Factor Analysis of ERM Implementation Intensity

3.13 STRUCTURAL EQUATION MODELING

3.13.1 Introductory

As mentioned in section 3.8 regarding the research analytics, we employ path analysis using structural equation modeling or SEM to test our research framework's theoretical veracity. SEM is a technique combining elements of multiple regression and factor analysis to perform complex interrelated dependence relationships. SEM's vigor is in its ability to incorporate the effects of measurement error on the structural coefficients whilst performing the multiple regression and factor analyses (Hair et al., 1998). SEM enables researchers to validate theory by testing the total, direct, and indirect effects of latent or unobserved and manifest or observed factors (variables). It also allows investigation for the effect of mediation (intervention) that exists among variables (Anderson & Gerbing, 1988; Hair et al., 1998; Chin, 1998; Hoe, 2008). In other words, SEM involves the specification of an underpinning linear regression-type model which incorporates the relationships between the latent variables together with a number of observed or measured indicator variables. Examining the co-variation between the observed variables enables us to: (1) estimate the values of the coefficients in the underpinning linear model; (2) statistically test the adequacy of the model to adequately represent the process(es) being studied; and (3) if the model is adequate, conclude that the postulated relationships are plausible (Palaniappan, 2008).

SEM consists of *measurement model* or confirmatory factor analysis (CFA) and *structural model* (Hoe, 2008). Measurement model in SEM refers to the process of specifying *indicators* for each construct and the assessment of the each construct's reliability in estimating the causal relationship. Structural model, on the other hand, refers to the set of one or more dependence relationships linking the hypothesized model's *constructs* (Hair et al., 1998). Hair et al. (1998, p.628) proposed the undertaking of SEM analysis in seven-stage process. They include: *Stage 1*–Develop a Theoretical Based Model; *Stage 2*-Construct a Path Diagram; *Stage 3*-Convert the Path Diagram; *Stage 4*-Choose the Input Matrix Type; *Stage 5*-Assess the Identification of the Mode; *Stage 6*-Evaluate Model Estimates and Goodness-of-Fit; *Stage 7*-Model Modification (Hair et al., 1998).

This thesis organizes the discussion of the practical framework's analysis in tandem with this seven-stage process. The discussion at each stage illustrates the relevant issues and interpretation of the practical framework in the context of its SEM. The details are presented in the ensuing sections 3.13.2 to 3.13.7.

3.13.2 SEM Stage 1: Developing A Theoretically Based Model

Hair et al. (1998) noted that causal relationships are the basis in SEM analysis. These causal relationships explain how changes in variables (predictors) will result in changes in other variables (dependent variables) (Khong & Richardson, 2003). In our context, SEM explains how implementation intensity of ERM will affect perceived ERM benefit measures. In addition, how challenges in ERM implementation process affect both ERM implementation intensity and the perceived benefit measures. The assertion for causation among variables has to be done through theoretical determination. Without theoretical basis, any causal assertion in a research framework will be rendered invalid (Hair et al., 1998; Khong & Richardson, 2003; Trochim, 2008). The theoretical based models in SEM comprised of the structural model and the measurement model (Hair et al., 1998; Khong & Richardson, 2003).

3.13.3 SEM Stage 2: Constructing A Path Diagram Of Causal Relationships

A path diagram is a diagram that pictorially represents a structural model in portraying causal relationships (Kenny, 2003; Khong & Richardson, 2003). It provides researchers an overall view of the causal relationships of the structural and measurement models. A path diagram that consists of a number of measured (i.e. observed) variables and unmeasured (i.e. latent) variables connected together by single-headed and double-headed arrows (see Figure 3.6). Path diagram depicts a clear distinction between measured and unmeasured variables. For instance, *latent*, *unmeasured*, or *unobserved* variables are denoted in path diagram by enclosing them in a circle whereas *manifest, measured* or *observed* variables are enclosed in rectangles or squares. In a path diagram, straight arrows represent direct causal relationships whilst curved lines between constructs represent correlation between constructs. Apart from that, double-headed arrows mean reciprocal relationship between constructs. In a path diagram, the model's exogenous constructs are "predictors or cause for other constructs". On the other hand, the model's endogenous constructs are "dependent or outcome" which are caused by one or more exogenous constructs (Hair et al, 1998, p.580; Khong & Richardson, 2003). Figure 3.6 depicts an example of a path diagram.

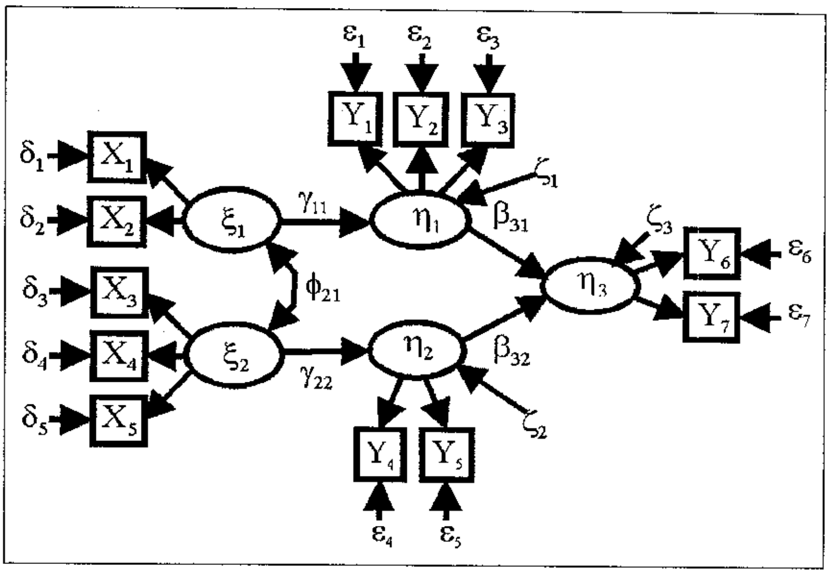


Figure 3.6: Example of a path diagram

3.13.4 SEM Stage 3: Converting The Path Diagram Into A Set Of Structural And Measurement Models

The path diagram in Figure 3.6 provides the basis for specification of the structural equations and the proposed correlation (1) between exogenous constructs and (2) between structural equations. From the path model, we construct a series of structural equations (one for each endogenous construct) to constitute the structural model. It follows with the specification of measurement model whereby indicators are assigned to each construct (exogenous and endogenous) such that each construct contains variables depicted by the equations. The purpose of these equations specification is to measure the theoretical rationale empirically. Hence, assessment can be made on the reliability of each construct for estimating the causal relationships. Test of the measurement model is conducted using confirmatory factor analysis. (Hair et al, 1998, pp 596-601; Khong & Richardson, 2003). Appendix 5 illustrates the specification of structural and measurement models into a series of equations for the study of this thesis.

3.13.5 SEM Stage 4: Choosing The Type Of Input Matrix And Estimating The Proposed Model

In contrast to other multivariate techniques, SEM uses only variance-covariance or correlation matrix as its input data (Hair et al., 1998, p.601). Variance-covariance matrix was selected because it is essential in theory testing, i.e. to investigate how ERM implementation intensity affects the ERM perceived benefit measures of Corporate Malaysia (Khong & Richardson, 2003). Data entry was done through AMOS which is a module for estimating SEM in a statistical software package SPSS. In variance-covariance testing, rather than focusing on individual observations, pattern of relationships across respondents was examined instead. As such, individual observations were converted into either the variance-covariance or correlation matrix before estimation was performed. This would facilitate the measurement model in specifying "which indicators correspond to each construct", and in computing the latent construct scores in the structural model (Hair et al., 1998, p.601).

In employing SEM, the following assumptions and settings are observed. Firstly, we assume that the data collected are independently observed, the sampling of respondents is random, and all relationships are linear. Secondly, the missing data are incorporated into SEM using listwise method[35]. Thirdly, estimation of the proposed model is done using 'direct estimation'[36]. Fourthly, the estimation procedure employs 'maximum likelihood estimation'[37] (MLE). MLE is used "to seek parameters that best reproduce the estimate population variance-covariance matrix (Thompson, 2000, p.267). According to Wright (2000), by using the observed variance-covariance matrix, MLE's results yield the highest probability of an event that actually happening (Khong & Richardson, 2003). Finally, the sample size used is in between 100 to 150. This is in accordance with the recommendation when using MLE to directly estimating the overall model (Ding et al., 1995; Hair et al., 1998, p.605; Khong & Richardson, 2003).

3.13.6 SEM Stage 5: Assessing The Identification Of The Structural Model

In SEM analysis, problem may arise when the proposed structural is unable to generate unique estimates. This is referred to as an identification problem. An identification problem arises from the fact that the model has lesser equations than the number of unknowns to be estimated. Hence, the researcher wants to ensure that

[35] A method that omits cases that have missing values for any of the variables named (see Hair et al., 1998, p.603).
[36] The most common estimation process whereby an overall model is estimated directly with a selected estimation procedure and the confidence interval (and standard error) of each parameter estimate is based on sampling error (see Hair et al., 1998, p.580).
[37] The most common estimation procedure which iteratively improves parameter estimates to minimize a specified fit function (see Hair et al., 1998, p.581).

the size of the co-variance or correlation matrix used in the analysis is larger than the number of coefficients to be estimated in the proposed model. This difference in the matrix size and the number of coefficients is referred to as degree of freedom *(df)* (Hair et al., 1998). As Hair et al. (1998, p.608) noted, a degree of freedom is "an unconstrained element of the data matrix". A proposed model's number of *df* is given by

$$df = \tfrac{1}{2}\,[(p + q)(p + q + 1)] - t$$

where:

p = the number of endogenous indicators,

q = the number of exogenous indicators,

t = the number of estimated coefficients in the proposed model (Hair et al., 1998, p.608).

A model with exactly zero degrees of freedom is called a *just-identified* model. A model with positive number of degrees of freedom is termed as an *overidentified* model. Conversely, a model with negative number degrees of freedom is referred to as an *underidentified* model. The researcher would look for a high *df* in his structural equation model while striving for a good model fit. A large number of *df* will entail the generalizability of the model (Hair et al., 1998).

3.13.7 SEM Stage 6: Evaluating Goodness-Of-Fit Criteria

Goodness-of-fit tests ascertain if the model under examination should be accepted or rejected (Garson, 2008). This stage involves two steps. Firstly, to examine "offending estimates" to ensure the proposed model can be established.

Common "offending estimates are negative error variances, standardized coefficients exceeding or very close to 1.0, or very large standard errors" (Hair et al, 1998, p 633). Secondly, to assess the proposed model's goodness-of-fit. This is to be done for the overall model, structural and measurement models (Hair et al., 1998). Fit refers to a model's ability to reproduce the data (Kenny, 2003). In other words, goodness-of-fit "measures the correspondence of the actual or observed input (covariance or correlation) matrix with that predicted from the proposed model" (Hair et al.,1998, p. 610). There are literally hundreds of measures of fit available to researchers (Kenny, 2003). Nonetheless, the major goodness-of-fit measures can be categorized into three groups, namely (1) absolute fit measures, (2) incremental fit measures and (3) parsimonious fit measures (Hair et al., 1998; Kenny 2003; Garson, 2008).

According to Hair et al. (1998, p.611), absolute fit measures "assess only the overall model fit (both structural and measurement models collectively)". The various absolute fit indexes are based on fitting the specified model to sample moments. The test is done by comparing the observed covariance matrix to the one being estimated. The test assumes that the model being tested is true (Garson, 2008).

Incremental fit measures, on the other hand, compare the specified (proposed) model to some baseline model. The baseline model is usually the null or independence model (Hair et al., 1998; Garson, 2008). The null or independence model has a maximum chi-square (Garson, 2008). Hair et al. (1998) suggested that the null model should be "some realistic model which all other models should be expected to exceed" (p.657). According to Hair et al. (1998) again, more often than not, the null or independence model "is a single-construct model with all indicators perfectly measuring the construct" (p.657).

Hair et al. (1998) pointed out that parsimonious fit measures "adjust the measures of fit to provide a comparison between models with differing numbers of estimated coefficients" (p.611). Models lack of parsimony will be penalized by parsimonious measures. This is because more complex models (less parsimony) will, all other things being equal, generate better fit than less complex ones (Garson, 2008). As such, the primary objective of the parsimonious fit measures is to examine if model fit has been attained by "*overfitting* the data with too many coefficients" (Hair et al., 1998, p.658). Incremental fit measures and parsimonious fit measures are also used to inspect the proposed and the competing model in determining which is better.

Each group of goodness-of-fit measures consists of several indices to serve their respective measurement purposes. Table 3.3 presents these major indices.

Table 3.3: Goodness-of-fit indices

Absolute Fit Measures	Incremental Fit Measures	Parsimonious Fit Measures
Likelihood-Ratio Chi-Square Statistic (χ^2)	Adjusted GFI (AGFI)	Parsimonious Normed Fit Index (PNFI)
Goodness-of-Fit Index (GFI)	Normed Fit Index (NFI)	Akaike Information Criterion (AIC)
Root Mean Square Residual (RMSR)	Relative Fit Index (RFI)	Comparative Fit Index (CFI)
Root Mean Square Error of Approximation (RMSEA)	Incremental Fit Index (IFI)	Parsimony Goodness of Fit Index (PGFI)
	Non-Normed Fit Index (NNFI) or Tucker-Lewis Index (TLI)	

The definition and meaning for each of these measures are presented in the following sections 3.13.7.1 to 3.13.7.13.

3.13.7.1 Likelihood-Ratio Chi-Square Statistic (χ^2)

The likelihood-ratio chi-square statistic is also referred to as discrepancy function or simply model chi-square (Garson, 2008). According to Hair et al. (1998), the likelihood-ratio chi-square statistic is the most fundamental measure of overall fit of the specified model. However, according to Garson (2008), model chi-square is very conservative, i.e. prone to Type II error, and sensitive to sample size (Hair et al., 1998). Hence, Garson (2008) suggested researchers to discount a negative model chi-square result in the presence of other model fit measures that support the specified model. A large value of chi-square means that the observed and estimated matrices differ considerably. In other words, the chi-square value should not be significant if there is a good model fit (Garson, 2008). As such, statistical significance levels (small p-values) are situations that researchers do not want to obtain. It indicates lack of satisfactory model fit. Low chi-square values on the other hand, which translate into significance levels greater than .05 or .01 (statistically insignificant at α=.05 and .01 levels), signify that the actual and predicted input matrices are not statistically different (Hair et al., 1998). Hair et al. (1998) suggested the minimum acceptable level of nonsignificance is at .05 and that the levels of 0.1 and 0.2 should be surpassed before nonsignificance is confirmed.

3.13.7.2 Goodness-of-Fit Index (GFI)

The goodness-of-fit index (GFI) provides the overall degree of fit (the squared residuals from prediction compared with the actual data) (Hair et al., 1998, p.655). This index ranges from value 0, indicating poor fit, to 1.0, representing perfect fit. It is, however, not adjusted for the degrees of freedom. Although higher values of the index are desirable for a model's better fit, there is no established specific threshold levels for the model's acceptability (Hair et al., 1998).

3.13.7.3 Root Mean Square Residual (RMSR)

The root mean square residual (RMSR) is an unstandardized coefficient of the square root of the mean of the squared residuals. It results from the amounts by which the sample variances and covariances differ from the corresponding estimated variances and covariances on the assumption that the specified model is correct (Garson, 2008; Hair et al., 1998). RMSR has a lower bound of zero but since it is unstandardized, it has no upper bound. The upper limit will be determined by the scale of the measured variables. Hence the closer RMSR is to 0, the better the model fit. Literature indicated various rules of thumb for an acceptable model fit reference such as < 0.10, or 0.08, or 0.06, or 0.05, or even 0.04 (Garson, 2008). According to Hair et al. (1998), researchers can evaluate "the practical significance of the magnitude of the RMSR in light of the research objectives and the actual covariances or correlations" (p.656).

3.13.7.4 Root Mean Square Error of Approximation (RMSEA)

The root mean square error of approximation (RMSEA) attempts to overcome the problem of chi-square statistic which is sensitive to large sample. RMSEA rectifies the tendency of the chi-square statistic "to reject any specified model with a sufficiently large sample" (Hair et al., 1998, p.656). The value between 0.05 and 0.08 are considered acceptable. Models whose RMSEA is 0.10 or more are deemed to have poor fit (Hair et al., 1998; Kenny, 2003). The values represent the model's expected goodness-of-fit if it were estimated in the population. This differs from the case of root mean square residual (RMSR) index, where the estimation is drawn from the sample (Hair et al. 1998).

3.13.7.5 Adjusted Goodness-of-Fit Index (AGFI)

Adjusted goodness-of-fit index (AGFI) is a variant of goodness-of-fit index (GFI) which adjusts GFI for the ratio of degrees of freedom of the proposed model to the degrees of freedom for the null model (Hair et al., 1998; Garson, 2008). AGFI > 1.0 indicates that the model is just-identified and also that the model is with almost perfect fit. On the other hand, AGFI < 0 represents extremely poor fit model, or as a result that based on small sample size. A rule of thumb suggests an acceptable value to be greater than or equal to 0.90 (Hair et al., 1998; Garson, 2008). AGFI is sensitive to sample size (Kenny, 2003; Garson, 2008). Its values tend to be small (biased downward) when degrees of freedom are large relative to sample size. Exception to this is when the number of parameters is very large (Garson, 2008).

3.13.7.6 Normed Fit Index (NFI)

Normed fit index (NFI) also referred to as the Bentler-Bonett index (Garson, 2008). It is a relative comparison of the proposed model to the null model (Hair et al., 1998). The null model (independence model in AMOS) is defined as a model whereby all of the correlations or covariances are zero (Kenny, 2003). NFI manifests the fraction by which the proposed model improves fit in comparison to the null model. For example, NFI = 0.60 indicates the proposed model improves fit by 60% compared to the null model (Garson, 2008). According to Hair et al. (1998), there is no absolute value indicating an acceptable level of fit. By convention, however, literature indicate that NFI values above 0.95 are considered good, between 0.90 and 0.95 deemed acceptable, and values below 0.90 represent a need to respecify the model (Garson, 2008).

3.13.7.7 *Relative Fit Index (RFI)*

The relative fit index (RFI) is also known as *rho1* (Garson, 2008; Amos16.0, 2007). The index represents comparison between the estimated model and the null (independence) model. For instance, RFI = 1 – [(chi-square for the default model / degrees of freedom for the default model) / (chi-square for the null model / degrees of freedom for the default model)]. RFI values lie between 0 and 1.0. Values close to 1 indicate a good fit (Garson, 2008; Hair et al., 1998).

3.13.7.8 *Incremental Fit Index (IFI)*

The incremental fit index (IFI) is also known as *Delta2* (Garson, 2008; Amos16.0, 2007). Similar to the RFI, the incremental fit index (IFI) denotes comparison between the estimated model and the null (independence) model. The convention suggests that IFI values of equal to or greater than 0.90 indicate acceptable model fit. IFI is a favored incremental fit measure as it is relatively independent of sample size Garson, 2008).

3.13.7.9 *Non-Normed Fit Index (NNFI) or Tucker-Lewis Index (TLI)*

The non-normed fit index (NNFI) is also called the Tucker-Lewis index (TLI) (Hair et al., 1998; Garson, 2008). The NNFI and TLI are also referred to as *rho2* (Garson, 2008; Amos16.0, 2007). NNFI/TLI is similar to the normed fit index (NFI), but it "penalizes for model complexity" (Garson, 2008). Marsh et al. (1998) revealed that TLI is relatively independent of sample size. According to Garson (2008), NNFI/TLI close to 1 represents a good fit. Garson (2008) also pointed out that some authors had used a cutoff as low as .80 given the fact that TLI tends to run lower than the goodness-of-fit index (GFI). However, other authors such as Hu and Bentler (1999) and Schumacker and Lomax (2004) suggested the cutoff to be greater than or equal to 0.95. Hair et al. (1998) pointed out that a commonly recommended value is 0.90 or greater. Garson (2008) suggested that NNFI/TLI values below 0.90 indicate a need to respecify the model.

3.13.7.10 Parsimonious Normed Fit Index' (PNFI)

The parsimonius normed fit index (PNFI) is a modified normed fit index (NFI) which incorporates the number of degree of freedom used to obtain a fit level (Hair et al., 1998). Parsimony is defined as "achieving higher degree of fit per degree of freedom used (one degree of freedom per estimated coefficient)" (hair et al., 1998, p.658). This measure penalizes the specified model if it is closer to the saturated model. The saturated model is an all-explaining but trivial model (Garson, 2008). Thus researchers look for more parsimony model. According to Garson (2008), by arbitrary convention, PNFI values greater than 0.60 indicate good parsimonious fit. Garson (2008) also noted that some authors used a PNFI threshold value of 0.50 to indicate a good parsimonious fit.

3.13.7.11 Akaike Information Criterion (AIC)

The alkaike information criterion (AIC) is a parsimonious fit measure that based on statistical information theory. It is a comparative measure between models with various numbers of constructs (Hair et al., 1998). In other words, AIC manifests the differences between model-implied and observed covariance matrices. It adjusts model chi-square to penalize for model complexity, i.e. lack of parsimony and "overparameterization" (Garson, 2008). AIC values closer to zero reflect better fit and greater parsimony (Hair et al., 1998; Garson, 2008). According to Hair et al. (1998), small chi-square values with fewer estimated coefficients will result in small AIC values.

3.13.7.12 Comparative Fit Index (CFI)

The comparative fit index (CFI) compares the existing model fit with a null model. The null model assumes that the latent variables in the model are uncorrelated (Garson, 2008). The test compares "the covariance matrix predicted by the model to the observed covariance matrix, and compares the null model (covariance matrix of 0's) with the observed covariance matrix, to gauge the percent of lack of fit which is accounted for by going from the null model to the researcher's SEM model" (Garson, 2008). The concept behinds the CFI test is similar to that of normed fit index (NFI) but it penalizes for sample size. The CFI is also identical to the McDonald and Marsh's (1990) relative noncentrality index (RNI) (Amos16.0, 2007). The values of CFI range from 0 to 1. Values close to 1 indicate a very good fit. By convention CFI values equal to or greater than 0.90 indicate acceptable model fit (Garson, 2008).

3.13.7.13 Parsimony Goodness of Fit Index (PGFI)

The parsimony goodness of fit index (PGFI) is a variant of goodness-of-fit index (GFI) which adjusts GFI for the parsimony of the estimate model (Hair et al., 1998; Garson, 2008). The PGFI value varies from zero to 1.0. Values close to 1.0 indicate greater model parsimony (Hair et al., 1998). According to Garson (2008), by arbitrary convention, PGFI values greater than 0.60 are considered as having good parsimonious fit. However, Garson (2008) also pointed out that some authors used the value of greater than 0.50 to indicate the same.

It is necessary to examine the various goodness-of-fit indices simultaneously because there is no single fit measure that is able to provide a conclusive assessment of the goodness of fit of the overall model. Besides, different measures exhibit different degrees of biasness and sensitivity to factors like number of cases involved in analysis and the size of the correlations in the model, to name a few (Kenny, 2003). Hence, in order to provide a better view and solicit more consensus and acceptability, researchers ought to examine and discuss more than one of these measures. (Garson, 2008; Khong & Richardson, 2003; Hair et al., 1998).

3.13.8 SEM Stage 7: Interpreting and Modifying The Two Models

In this final stage, once the model is deemed acceptable, the researcher will examine the results to see if major relationships specified in the proposed model underscored by the theory are supported by the empirical data (statistically significant) (Hair et al., 1998). Should the results indicate insignificant causal relationships of the variables and constructs, or display unsatisfactory model fit, the initial model may subject to re-specification. Under this situation, the researcher will then explore alternative models with the re-specification in the hope that they will offer more insight by making some alteration to the initial proposed model. Model re-specification involves the adding or omitting of the causal relationships in the proposed model. The re-specified model is known as the *competing model* or *modified model* in SEM. However, this alteration or re-specification to the structural model has to be done with the support and justification by the theory. In other words, the researcher has to be mindful of not distorting the underlying theory with the re-specification. The statistical procedures and measures in section 6.1 will be repeated in the process of estimating the competing model. Intuitively, the competing model should exhibit improved causal relationships than that of the initial proposed model. Once the re-specified model is finalized, all hypotheses will then be examined to see if causal relationships are in the hypothesized directions, i.e. positive or negative (Hair et al., 1998).

In our case, the interpretation of the two models will be based on the results from AMOS. We will examine the hypotheses that ERM implementation challenge will have a negative impact on the implementation intensity. In turn, implementation intensity will have a positive effect on the perceived benefit measures.

3.14 CORRELATION ANALYSIS OF THE HYPOTHESES TESTING

To test the hypotheses for the ERM value maximization theories, i.e. H_3 to H_9, and the ERM value creation transmission mechanism (CSL risk premium model), i.e. H_{10} to H_{12} (see section 3.3.4), this study employed correlation analysis to test the strength or significance of the association between the two metric variables involved in each hypothesis testing. On the one side of each hypothesis testing was the independent variable, i.e. ERM Implementation, and on the other side was the respective variable measuring the relevant hypothesis involved (see sections 3.7.5-3.7.7). Below depicts in chronological order, the procedures and measures that have been performed:

(i) Reliability analysis using SPSS:

   a. Cronbach's alpha

   b. Item-total correlation

(ii) Product moment correlation using SPSS:

   - Pearson correlation coefficient analysis

(iii) Significance of association analysis

3.15 RELIABILITY ANALYSIS

3.15.1 Introductory

The meaning and definition of reliability analysis has been presented earlier in section 3.9.1. To recapitulate, reliability analysis ought to be performed to ensure consistent data results before further multivariate analysis to be conducted. This analysis evaluates the reliability of the survey instrument; i.e. the questionnaire (Khong and Richardson, 2003). The internal consistency reliability analysis is performed to ensure consistency among the variables in a summated scale. For instance, in the hypotheses testing relating to the CSL risk premium model (H_{10}, H_{11}, and H_{12}), three constructs are involved for the dependent variables, i.e. *tactical*, *strategic*, and *normative* risks. Since all of these constructs are measured by multiple statements making up their respective summated scale, the internal consistency reliability for each summated scale has to be ascertained. High internal consistency reliability shows that items measuring the same scale (construct) are highly intercorrelated (Hair et al., 1998; Khong & Richardson, 2003).

3.15.2 Cronbach's Alpha

Cronbach's alpha is a commonly used technique to measure internal consistency (Hair et al., 1998; Khong & Richardson, 2003). The Cronbach's alpha values range from 0 and 1.0 (Hair et al., 1998). The higher values indicate higher degrees of homogeneity among items measuring a scale (Hair et al., 1998; Khong & Richardson, 2003). In our context, the Cronbach's alpha values gauge if the questionnaire measures the 'tactical risk', 'strategic risk', and the 'normative risk' in a useful manner. It also gauges the extent of intercorrelation among items (inter-item correlations) within a scale/construct. Items with low Cronbach's alpha values within each scale will be omitted for further analysis to improve reliability of the scale. A rule of thumb suggests that acceptable Cronbach's alpha values should exceed 0.7 (Hair et al., 1998; Khong & Richardson, 2003).

3.15.3 Item-Total Correlation

Item-total correlation measures "the correlation of the item to the summated scale score" (Hair et al, 1998, p 118). It was used to gauge the relationship of one variable with the rest in the set of measures or scale. In other words, the test provided information whether the variables share a common core in measuring up a scale/construct. Variables with unsatisfactory item-total correlation score were discarded for further analysis to ensure high reliability of the scale or construct. A rule of thumb suggests that acceptable item-total correlation value should exceed 0.5 (Hair et al, 1998, p 118). Reliability analysis was performed using SPSS program.

3.16 PRODUCT MOMENT CORRELATION

Product moment correlation is a statistic summarizing the strength of association between two metric variables (Malhotra, 2004). It is a measure (index or coefficient) of the linear dependence between two variables X and Y. The index indicates the degree to which the variation in one variable, X, is related to the variation in another variable, Y. The product moment correlation statistic was developed by Karl Pearson and therefore it is also known as *Pearson correlation coefficient*. Mathematically, the correlation coefficient between two variables is defined as the covariance of the two variables divided by the product of their standard deviations. The coefficient is typically denoted by a symbol r and takes a value between +1 and −1 inclusive. According to Malhotra (2004), the correlation coefficient is an absolute number and is not expressed in any unit of measurement. A value of 1 indicates a perfect linear relationship between X and Y, implying that Y increases as X increases in the same magnitude of percentage on a line where all data points are lying. On the other hand, a value of −1 indicates that Y decreases as X increases in the same magnitude of percentage. A value of 0 implies that there is no linear correlation between the variables. The value 0, however, does not mean that the two variables are unrelated. There is still possibility that a nonlinear relationship could exist between them (Malhotra, 2004).

3.17 TEST STATISTIC FOR SIGNIFICANCE OF ASSOCIATION

To test the statistical significance of the relationship between two variables measured by using the product moment correlation as discussed in section 3.16 above, the following hypotheses are developed:

H_0: $\rho = 0$

H_1: $\rho \neq 0$

From the above, the null hypothesis, H_0, proposes that there is no linear relationship (relationship = 0) between two variables. The alternative hypothesis, H_1, on the other hand proposes there is linear relationship between the two variables.

The test statistic is given by:

$$t = r\,[\,(n - 2) / (1 - r^2)\,]^{1/2}$$

where t = calculated t-value

r = product moment correlation coefficient

n = number of cases under examination

The above test statistic has a *t* distribution with n – 2 degree of freedom. We can refer to *t* distribution table provided by a statistical reference to determine the critical value of *t* for a two-tailed test at a particular confidence level, i.e. α=0.05. After having determined the critical value of *t*, we compare it with the calculated t value derived from the formula as shown above to determine its statistical significance (Maholtra, 2004). Many software applications such as SPSS software package offers a convenient way to perform the above test statistic for significance of association.

CHAPTER 4 FINDINGS AND ANALYSIS

4.1 RESULTS OF THE SURVEY

From the research population of 960 public listed companies (PLCs), a total of 400 telephone and email contacts were made to the selected PLCs (the elements) identified through stratified sampling process to solicit their participation in the survey. Out of the 400 contacts made, 100 were to the top-100 largest PLCs by market capitalization, i.e. the stratum 1 of the stratified sampling (see section 3.6), and the remaining 300 contacts were made to the randomly selected elements (PLCs) of the stratum 2 sampling. Out of these contacts made, 200 questionnaires were sent out through either postal mail or email to the respondents following their verbal agreement to participate in the survey. *Appendix 1* presents a sample of the questionnaire. The telephone calls made and the emails sent out to the selected respondents in the sampling were meticulously done in such a way that they reached the 'right persons' within the selected companies to answer the questionnaires. The 'right persons' means senior company officials (managers and above) who had had experiences in implementing or participating in enterprise risk management initiatives within their organizations.

4.1.1 Survey Execution: The Targeted Respondents

The execution of the survey was carried out to deliberately target the firms' *chief risk officers* or *enterprise risk managers*. However, not all targeted firms had the above position designations created within their organizational hierarchy. Neither did all firms have a dedicated risk management department within their corporate structure. Nevertheless, this did not mean that enterprise risk management initiatives were absent from the organizations' managerial activities. In such instances, ERM initiatives were usually carried out together or embedded with other corporate initiatives. Further more, the ownerships of such ERM programs were also assumed by a department other than a dedicated enterprise risk management department. The reason for not having a dedicated enterprise risk management department within the organizational structure was mainly to conserve corporate financial and human resources. For instance, this study found that it is rather common in some firms that the function of ERM was parked in the firms' internal audit department. There were also instances where the role of the chief risk officer was assumed by the chief executive officer. As such, the definition of the above 'right persons' profile was the next best alternative available to otherwise the ideal chief risk officers or enterprise risk managers to answer the survey questionnaires.

4.1.2 Questionnaires in 2 Batches

The questionnaires were sent out in two batches. Additional questions were added to the questionnaires sent out for the second batch respondents. The additional questions were incorporated to enable the study to test the ERM value maximization hypotheses and the strategic risk premium (CLS model) hypotheses. There were altogether 21 additional questions (statements) included in the second batch questionnaires. Out of the additional questions, 2 questions were for describing the ERM implementation outcome. They are (1) reduces company's expected taxes, and (2) reduces the cost for external financing. The other 19 additional questions were to cover the variables measuring the conceptualization of the strategic risk premium framework, i.e. the CLS model. These statements described the various situations that were transpiring in the firms in regard to the ERM implementation. They are (1) ERM implementation helps reduce company's overall risk premium, (2) there is minimum information friction between the management and the shareholders, (3) there is minimum gap of risk preference between the management and shareholders of firm's investment undertaking, (4) there is satisfactory liquidity/free float of firm's shares traded in the stock exchange (5) hedging strategy employed by firm is effectively meeting its intended objectives, (6) the use of real options to reduce firm's earning surprises is effective and satisfactory, (7) management is effective in isolating firm's earnings from market forces/uncertainty, (8) management is effective in shaping the firm to attain and sustain its structural advantages, (9) management is effective in isolating its earnings from rivals attacks through attaining structural advantages, (10) our enterprise has attained resource-based advantages, (11) our enterprise's resource-based advantages has helped isolate it from market pressures, (12) our enterprise has attained knowledge-based advantage, (13) our firm is able to absorb, interpret, and commercialize critical information on a timely basis which has helped to isolate its earnings from rival attack, market pressure, and technological obsolescence, (14) our firm has attained strategic options advantages (i.e. ability to diversify business line, expand market reach and product offering, acquire key supplier), (15) our firm possesses a portfolio of strategic options (i.e. ability to diversify business line, expand market reach and product offering, acquire key supplier) which has enabled it to mitigate macroeconomic and industry disturbances risk, (16) our enterprise is successful in complying with industry and regulatory rules, (17) our firm will face higher risk premium if we fail to comply with industry or institutional norms (i.e. those market rules expected by investors, regulators, interest groups), (18) our firm's competitive advantages achieved through implementing strategic (i.e structure, resource, knowledge advantages) risk management will be quickly matched by our competitors, (19) our firm's competitive advantages achieved through implementing tactical (hedging and options) risk management will be quickly matched by our competitors.

Appendix 2 presents these additional questions that were incorporated in the batch 2 questionnaires. These additional questions were utilized to perform the bivariate correlation tests on the hypotheses in regard to the ERM value maximization theory and the CLS model of strategic risk premium hypotheses (see sections 3.3.2-3.3.3 on these hypotheses development). There were 31 answered questionnaires collected from the second batch survey exercise.

4.1.3 Respondents' Designation Profile

From the two batches of questionnaires sent out (totaling 200), a total of 128 questionnaires were returned, constituting 32.0% response rate of the telephone calls made and 64.0% of the questionnaires sent out respectively. Out of these questionnaires received, 22 of the respondents (17%) carried the position designations of, or similar to that of (senior) risk manager; 18 of them (14%) were internal auditors; 6 of them (5%) were either chief financial officers (CFO) or financial controllers; another 6 of them (5%) were either executive directors or vice presidents (VC); 4 of them (3%) were either chief operating officers (COO) or general managers (GM); 2 of them (1%) were either managing director (MD) or chief executive officer (CEO); and the rest 70 of them (55%) were managers or senior officials of the surveyed firms holding various titles such as senior process engineer, operations manager, group planning manager, senior finance manager, corporate planning manager, customer service manager, and compliance manager. Figure 4.1 presents the graphical breakdown of the respondents' position designations in their respective organizations.

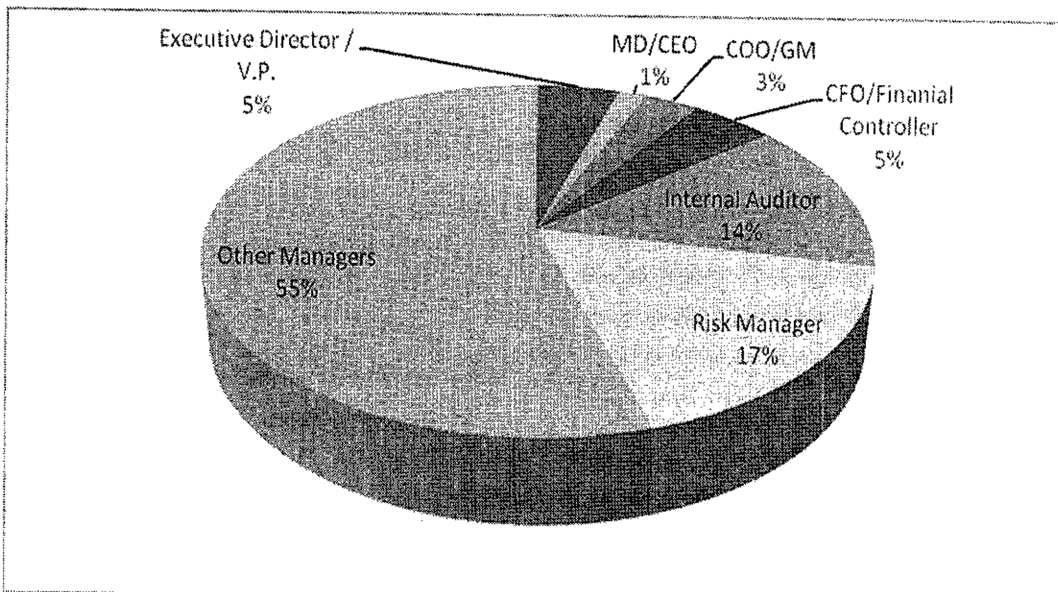


Figure 4.1: Survey respondents' designation breakdown

4.1.4 Surveyed Firms by Market Sectors

The public listed companies on the Bursa Malaysia's *main market* are categorized into market sectors in accordance to the industries in which these firms conducted their main business activities. Among others, the main purpose of this classification is to facilitate the computation of stock indices along these market sectors. There are eleven market sectors as per the Bursa Malaysia's classification, namely (1) construction, (2) consumer product, (3) finance, (4) industrial product, (5) mining, (6) plantation, (7) properties, (8) technology, (9) trading/service, (10) hotels, and (11) infrastructure project. From the received questionnaires, 48 of the surveyed firms were in trading/services sector; 23 were in consumer product and industrial product sectors respectively; 16 were in finance sector; 5 were in construction sector, 7 were in properties sector; 3 were in plantation and technology sectors each; and none was in mining, hotels, and infrastructure project sectors. The distribution of the surveyed firms in each market sector generally reflects the population distribution of the PLCs on the Bursa Malaysia's *main market*. Names of the companies participated in the survey are not presented to maintain the confidentiality of them as a condition agreed upon during the survey exercise. Figure 4.2 portrays the breakdown by Bursa Malaysia's market sectors of the received questionnaires.

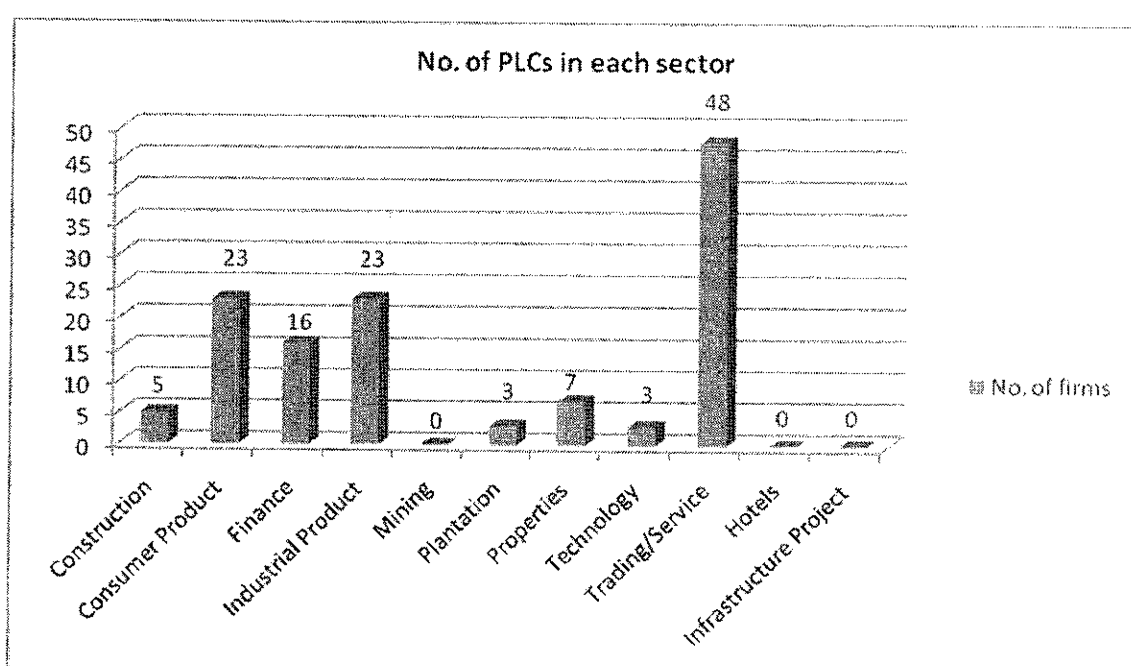


Figure 4.2: Breakdown of surveyed PLCs in each market sector

4.1.5 Incomplete and Offending Data

Upon examination of the returned questionnaires, six questionnaires (cases) and seven variables (i6, c4, c9, b15, b17, b19, and b20) were omitted for further analysis in the structural equation modeling (SEM) analysis due to incomplete or offending data (see Hair et al., 1998, p.51). Incomplete data happened because many respondents did not answer or give rating to a particular statement in the questionnaire. For instance, upon inspection, the six questionnaires (cases) omitted for further analysis mentioned above presented many unanswered statements by the respondents involved. Further more, after close examination, seven statements (variables) in the questionnaires presented many instances where they were not rated by the respondents. For example, variables b17 and b20 were only answered by the batch 2 respondents which numbering only 31 cases. Other omitted variables were rated in less than 122 cases. The number 122 became the accepted threshold of cases for analysis in the structural equation modeling for the ERM framework as it falls within the recommended range of number of cases for SEM analysis by Hair et al. (1998). Under such circumstances, in order to preserve the overall integrity and robustness of the collected data for the SEM analysis, it is advisable and deemed appropriate to simply discard the problematic cases and variables (Hair et al., 1998). As such, only 122 questionnaires were accepted for the analysis. Table 4.1 displays the deleted variables for SEM analysis.

Table 4.1: The deleted offending variables

Variable	Statement
i6	Enables tracking costs of compliance
c4	Over-regulation in organization hinder ERM implementation
c9	There is insufficient necessary level of investment for ERM implementation
b15	Reduces information gap between managers and investors
b17	ERM implementation has a positive impact on enterprise's credit rating
b19	ERM can minimize agency cost
b20	Implementing ERM program will be rewarded by the equity market

There were many potential explanations that could be associated with the above statements not being rated as frequently as others. Apart from the reason that they were presented only to the batch 2 respondents (numbering only 31), the other primary reason could be due to the fact that respondents encountered difficulty to associate, or to quantitatively rate the situation transpired in their firms with that of being described by the statements. As a result, for expediency to complete answering the rest of the questionnaire, the respondents would have just skipped or ignored these statements.

Notwithstanding their omission from the SEM analysis, variables b15, b17, b19, and b20 were utilized for hypotheses testing on the value maximization theory of ERM program implementation in bivariate correlation analysis.

4.1.6 Accepted Questionnaires by Sampling Stratums

Of the 122 accepted questionnaires, 42 of them were from the top 100 largest listed companies in Bursa Malaysia by market capitalization, i.e. the stratum 1 sampling. These respondent companies were also component companies in the 100-stock Kuala Lumpur Composite Index (KLCI) before the index's computation was replaced by the 30-stock FTSE Bursa Malaysia KLCI on 6 July 2009. The remaining 80 were from elements in the stratum 2 sampling. Together, these 122 questionnaires constituted about 13% sampling size of the total 960 listed companies (the population) on the Bursa Malaysia.[38] Figure 4.3 depicts the information on the number of questionnaires received and the number of questionnaires accepted for data analysis.

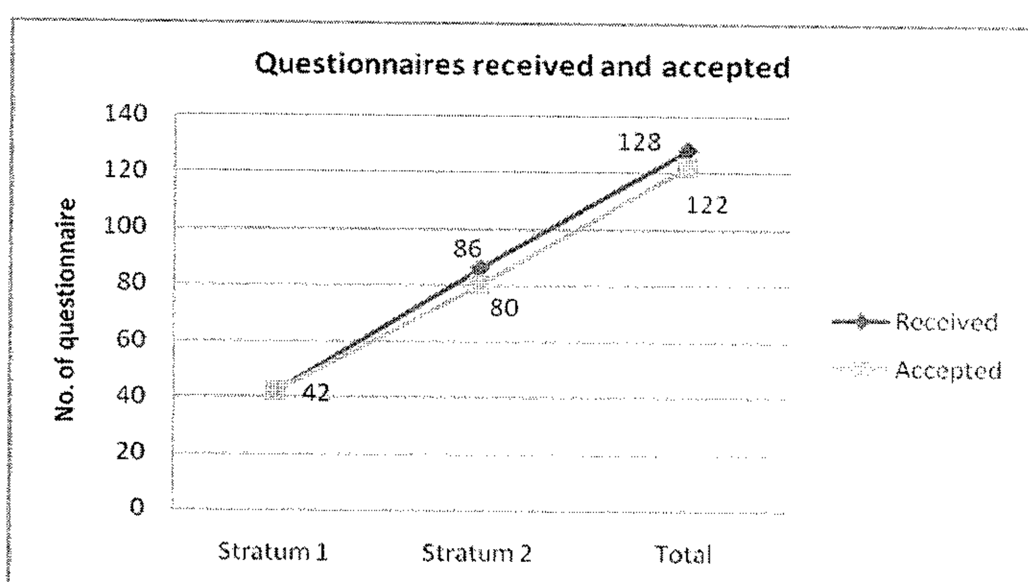


Figure 4.3: Information on questionnaires received and accepted

[38] Source: Bursa's Bulletin "BursaBytes", Issue 2, Vol 1, July 2009.

In view of the design, length and respondents' incentive of the survey instrument, this response rate was considered acceptable (Hague & Jackson, 1999; Churchill, 1995; Khong & Richardson, 2003). Further more, the sample size fell within the required 100–150 (see sections 3.6 and 3.13.5). Table 4.2 summarizes the survey execution information.

Table 4.2: Survey Respondents' Information

	Sampling		
	Stratum 1	*Stratum 2*	**Total**
Targeted Population	100	860	960
Phone calls / email made	100	300	400
Questionnaires sent	100	100	200
Questionnaires returned	42	86	128
Questionnaires accepted	42	80	122
Sampling rate			
• by stratum	42.0%	9.3%	25.7%*
• by overall population	4.4%	8.3%	12.7%

*average

4.1.7 Organization of Data Analysis

What follow in this chapter are discussions on the findings of data analysis of the survey exercise. The discussions are organized into four main parts, which in turn are divided into the various sections as described below.

Section 4.2 (part 1) presents analysis of the depth of penetration of ERM practices among the PLCs. The mean scores of all fourteen statements in the questionnaire measuring ERM implementation intensity (items i1, i2, i3, i4, i5, i6, i7, i8, i9, i10, i11, i12, i13, and i14) (see *Appendix 1*) are computed. Descriptive frequency distribution analysis of the mean scores is performed along the various *dimensions* and *areas* of the ERM implementation framework that had been articulated as in section 3.7. The mean scores are examined and interpreted based on a semantic scale that has been developed to describe the intensity of ERM implementation.

Sections 4.3 to 4.10 (part 2) discuss the analysis and findings of the **SEM model** of the proposed ERM implementation framework (**practical framework**) highlighting the causal relationships among constructs (and their respective factors) *ERM Implementation Intensity*, *Perceived ERM Benefit Measures*, and *Implementation Challenge*. The outcome of this powerful SEM analysis has enabled the proposed ERM framework to serve as a predictive model for a successful ERM implementation program for enterprises. The hypotheses being tested are H_1 and H_2 as defined in section 3.3.1.

Section 4.11 (part 3) discusses analysis and findings of hypotheses testing on the **value maximization theory** of ERM program implementation. The hypotheses being tested are H_3, H_4, H_5, H_6, H_7, H_8, and H_9 as defined in section 3.3.2 (also sub-sections 3.3.2.1-3.3.2.5). The hypotheses are tested using bivariate correlation analysis.

Section 4.12 (part 4) discusses analysis and findings of hypotheses involving the **ERM value creation transmission mechanism** through the conceptualization of the strategic risk premium model (the **CLS model**). The hypotheses being tested are H_{10}, H_{11}, and H_{12} as defined in section 3.3.3 (also sub-sections 3.3.3.1-3.3.3.3). The hypotheses are tested using bivariate correlation analysis.

4.2 DESCRIPTIVE FREQUENCY DISTRIBUTION ANALYSIS OF ERM PENETRATION LEVEL

4.2.1 Introductory

One of the objectives of this study is to examine the penetration level of ERM practices among the PLCs in Malaysia. In sections 3.7.1 and 3.7.2 this thesis has described the ERM Implementation framework and its measurement metric. To recapitulate, ERM implementation intensity metric is measured by fourteen statements proxying three dimensions of ERM implementation framework, namely *structure*, *governance*, and *process*. Each dimension of the ERM implementation framework can be further articulated into separate areas. And each area is measured by one or more statements (items) in the questionnaire. For instance, the **structure** dimension is articulated to be covering two areas, i.e. *ERM definition*, and *performance measurement*, and these two areas are measured by four statements in the questionnaire. Similarly, the **governance** dimension is measured by four statements covering two areas, i.e. *information and roles*, and *compliance*. On the other hand, the **process** dimension is measured by six statements covering three areas, i.e. *integration of business strategy and objectives*, *risk identification and response*, and *risk quantification*. Table 3.2 in chapter 3 presents the relevant statements measuring each corresponding area in the respective dimensions of the ERM implementation framework.

To examine the depth of ERM practices penetration among the public listed companies, this study analyzed the frequency distribution of mean scores for the summated scales of the various dimensions and areas of the ERM implementation intensity metric provided by the PLCs through questionnaires. To provide a clearer perspective and better interpretation of the PLCs' ERM implementation intensity, this thesis develops a descriptive semantic scale as shown in Table 4.3 to provide a reference to the corresponding ranges of mean scores of the summated scales that are computed from the 5-point Likert's scale.

Table 4.3: Semantic Scale for ERM Implementation Intensity

Mean score (on 5-point Likert's scale)	**Semantic scale (ERM Implementation Intensity)**
4.0 – 5.0	Excellent
3.5 – 4.0	Good
3.0 – 3.5	Satisfactory
< 3.0	Poor

Results of the mean scores for each ERM implementation dimension, its overall average mean score, and their corresponding semantic scale interpretations are presented in Table 4.4.

Table 4.4: Mean Score Analysis Results of ERM Implementation Intensity Dimensions

ERM Dimension	**Mean Score**	**Semantic Scale**
Structure	3.89	Good
Governance	3.75	Good
Process	3.81	Good
Overall average	**3.82**	**Good**

Results in Table 4.4 indicate the overall average mean score gauging the PLCs' ERM implementation intensity is 3.82. This value falls within the semantic scale of 'good' as defined in Table 4.3. As a result, we can infer that the overall ERM penetration level among the PLCs is rather encouraging. The detailed results of the descriptive frequency distribution analysis for each area of the ERM implementation intensity dimension are presented below.

4.2.2 The Structure Dimension of ERM

Table 4.5 presents the mean scores for each item (statement) in the questionnaire that are measured in 5-point Likert's scale gauging the *structure* dimension of ERM implementation framework. There are four items measuring this dimension, i.e. i1, i2, i11, and i12. Two items covering an area each. As shown in Table 4.5, the mean scores range from 3.70 to 4.06, all falling within the 'good' category of the semantic scale interpretation (refer to Table 4.3).

Table 4.5: Mean Scores of Individual Items/Areas for the *Structure* Dimension

Area	Items	Statement	Mean Score	
			Individual	Average
ERM Definition	i1	provides common understanding of the objectives of each ERM initiative	3.83	3.945
	i2	provides common terminology and set of standards of risk management	4.06	
Performance Measurement	i11	Identifies key risk indicators (KRIs)	3.98	3.840
	i12	Integrates risk with key performance indicators (KPIs)	3.70	

Figure 4.4 depicts the frequency distribution of respondents' rating responses for the pertinent items in the questionnaire covering the two areas, i.e. *ERM definition* and *performance measurement*, which measure the **structure** dimension of ERM implementation framework. The X-axis displays four ranges of the average mean scores of the summated scale of *ERM definition* and *performance measurement*. The X-axis also presents the corresponding semantic scale interpretation as per definition in Table 4.3. On the other hand, the Y-axis indicates the frequency of cases that falls within each rating range or semantic scale. Higher rating scores signify situations where ERM implementation is in high intensity. In other words, the higher the score, the more penetrated are ERM practices among the PLCs. For instance, referring to Figure 4.4, there are approximately 80 respondents whose mean score rating for the statements measuring *ERM definition* and *performance measurement* of the **structure** dimension of ERM implementation falls within the range of '4.0 – 5.0'. This is equivalent to an 'excellent' situation of ERM implementation intensity by the PLCs.

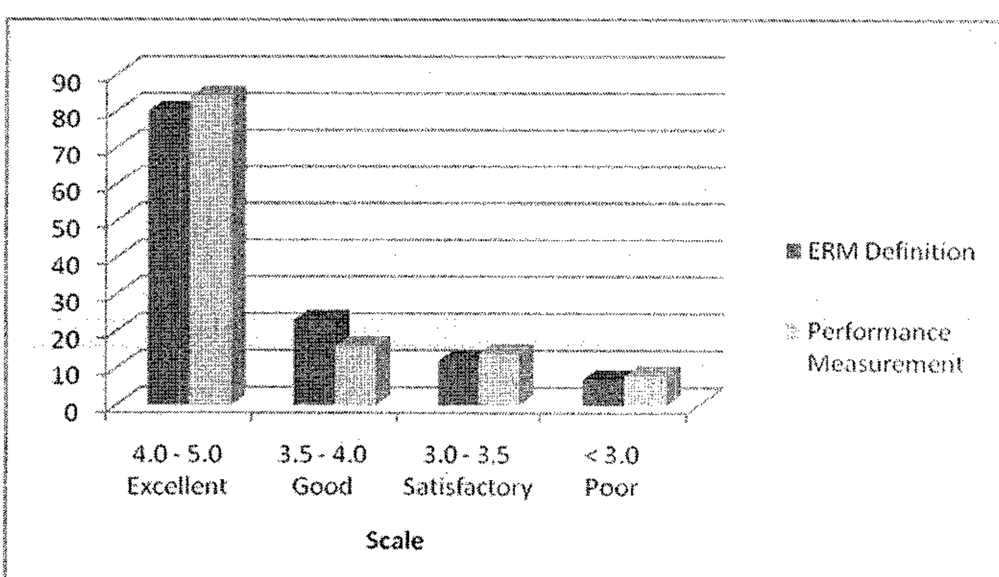


Figure 4.4: Respondents' Rating in 2 Areas of ERM Framework's *Structure* Dimension

4.2.3 *The Governance Dimension of ERM*

Table 4.6 displays the mean scores for four items, i.e. i3, i9, i5, and i6, which measure the **governance** dimension of ERM implementation framework. Out of these four items, two items (i3 and i9) cover the area of *information and roles* whilst another two items (i5 and i6) cover the area of *compliance*. Results in Table 4.6 indicate that the average mean scores for the two areas in the **governance** dimension are 3.98 and 3.52, the values of which are within the 'good' category of the semantic scale interpretation (refer to Table 4.3).

Table 4.6: Mean Scores of Individual Items/Areas for the *Governance* Dimension

Area	Items	Statement	Mean Score	
			Individual	Average
Information and roles	i3	provides enterprise-wide information about risk	4.02	3.975
	i9	Enables everyone to understand his/her accountability	3.93	
Compliance	i5	Reduces risk of non-compliance	3.78	3.520
	i6	Enables tracking costs of compliance	3.26	

Figure 4.5 depicts the frequency distribution of respondents' rating responses for the two areas in the **governance** dimension of ERM implementation framework, i.e. *information and roles,* and *compliance*. Referring to Figure 4.5, majority of the respondents rated the mean scores in the range of 'excellent' in this dimension (areas).

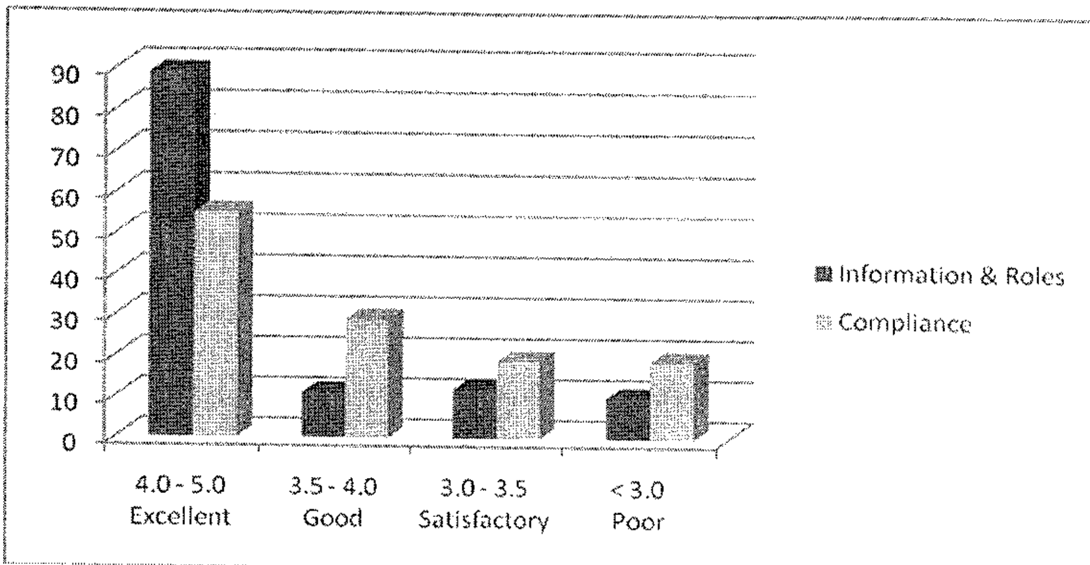


Figure 4.5: Respondents' Rating in 2 Areas of ERM Framework's *Governance* Dimension

4.2.4 The Process Dimension of ERM

Table 4.7 presents the mean scores for six items, i.e. i4, i8, i10, i13, i14, and i7. These six items measure the **process** dimension of ERM implementation framework. Out of these six items, four items (i4, i8, i10, and i13) cover the area of *integration of business strategy and objectives* whilst one item (i14) measures the area of *risk identification and response* and another item (i7) gauges *risk quantification.* Results in Table 4.7 indicate that the average mean scores for all the three areas in this **process** dimension of ERM implementation framework are within the 3.5 to 4.0 range of implementation intensity, which corresponds to the 'good' category of the semantic scale interpretation (refer to Table 4.3).

Table 4.7: Mean Scores of Individual Items/Areas for the *Process* Dimension

Area	Items	Statement	Mean Score	
			Individual	Average
Integration of business strategy and objectives	i4	Integrates risk with corporate strategic planning	3.90	3.843
	i8	Integrated across all functions and business units	3.80	
	i10	ERM strategy is aligned with corporate strategy	3.93	
	i13	Aligns ERM initiatives to business objectives	3.74	
Risk identification and response	i14	Provides the rigor to identify and select risk responses (i.e. risk-avoidance, reduction, sharing and acceptance)	3.77	3.770
Risk quantification	i7	Quantifies risk to the greatest extent possible	3.69	3.690

Figure 4.6 portrays the frequency distribution of respondents' rating responses for the three areas in the **process** dimension of ERM implementation framework, i.e. *integration of business strategy and objectives, risk identification and response,* and *risk quantification.* Similar to the frequency distribution of the previous two dimensions, majority of the respondents rated the mean scores of the three areas in the range of 'excellent' in this **process** dimension of ERM implementation framework.

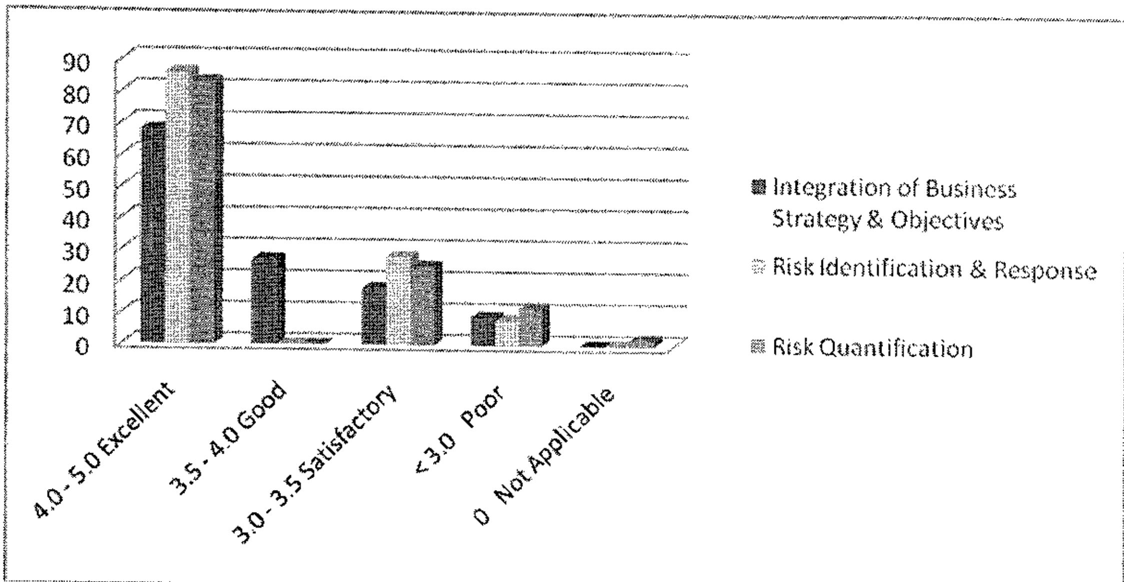


Figure 4.6: Respondents' Rating in 2 Areas of ERM Framework's *Process* Dimension

4.2.5 Conclusion

The mean scores of all fourteen statements in the questionnaire measuring ERM implementation intensity (i.e. items i1, i2, i3, i4, i5, i6, i7, i8, i9, i10, i11, i12, i13, and i14) were computed. The average mean scores were examined for the depth of penetration of ERM practices among the respondents. Analysis of the mean scores along the three dimensions and the various areas of the ERM implementation framework was also performed.

Results of the analysis indicate that the intensity of ERM program implementation among the respondents is 'good', with the average mean score of 3.82 on the 5-point Likert's scale. Hence, it can be concluded that the penetration of ERM practices among Malaysian listed companies are relatively encouraging. This is so considering that Malaysia does not have specific laws governing corporate risk management like that of SOX in the United States. Obviously, it would seem to be in the best interest of shareholders if the results would have been in the category of "excellent". Nonetheless, by placing the findings in a bigger scheme of things (vis-à-vis the regulatory requirement for ERM in Malaysia), it seems that ERM practices among the PLCs are heading in the right and desirable directions.

4.3 RELIABILITY ANALYSIS

SPSS was used to perform reliability analysis to calculate Cronbach's alpha on the variables. The analysis was to test the degree of consistency of variables when measuring the indicators for *ERM implementation intensity*, *implementation challenge*, and *perceived ERM benefit measures* for the ERM practical framework. The indicators were denominated alphabetically and numerically in a systematic manner. For instance, indicators for the three constructs: *implementation intensity*, *implementation challenge*, perceived *benefit measures* were denoted i1, i2, i3, etc; c1, c2, c3, etc; and b1, b2, b3, etc respectively. The corresponding indicators for the three constructs are shown in Table 4.8a, 4.8b and 4.8c. As described in section 3.9.2, a rule of thumb suggests that the acceptable Cronbach's alpha value should exceed 0.7 (Hair et al, 1998, p 118). The Cronbach's alpha value was 0.900 (see *Appendix 3*) implying the questionnaire was measuring the ERM implementation intensity, implementation challenge, and perceived ERM benefit measures in a useful manner. Hence, all variables were retained. The calculation of reliability analysis was based on the recommended default settings of the SPSS Application Guide (Anon, 1999a).

Table 4.8a: Indicators for construct ERM Implementation Intensity

ERM Implementation Intensity			
i1	Provides common understanding of the objectives of each ERM initiative	i9	Enables everyone understands his/her accountability
i2	Provides common terminology and set of standards of risk management	i10	ERM strategy is aligned with corporate strategy
i3	Provides enterprise-wide information about risk	i11	Identifies key risk indicators (KRIs)
i4	Integrates risk with corporate strategic planning	i12	Integrates risk with key performance indicators (KPIs)
i5	Reduces risk of non-compliance	i13	Aligns ERM initiatives to business objectives
i7	Quantifies risk to the greatest extent possible	i14	Provides the rigor to identify and select risk responses (i.e. risk- avoidance, reduction, sharing and acceptance)
i8	Integrated across all functions and business units		

Table 4.8b: Indicators for construct Implementation Challenge

Implementation Challenge			
c1	People is an area posing big challenge	c6	There is wide discrepancy between expectation and practices in ERM implementation
c2	Timeliness of information is a problem	c7	There is inadequate technology support
c3	There is lack of information needed	c8	The organization structure deters ERM implementation
c5	There is strong competition from other type of management techniques to be implemented		

Table 4.8c: Indicators for construct Perceived ERM Benefit Measures

Perceived ERM Benefit Measures	
b1 Enhances enterprise's ability to take appropriate risks in value creation b2 Strengthens management's confidence in business operations b3 Creates smooth governance procedures b4 Improves monitoring of enterprise performance b5 Enriches corporate reputation b6 Improves clarity of organization-wide decision-making and chain of command b7 Facilitates reporting to regulators b8 Improves communicating to stakeholders / shareholders	b9 Enhances managers' ability to think entrepreneurially and innovatively b10 Boosts enterprise's profitability b11 Assists in meeting enterprise's strategic goals b12 Reduces expected costs of financial distress b13 Protects company's investments b14 Reduces volatility of managers' bonuses and salaries b16 Managers are risk conscious b18 ERM helps our enterprise to be respected within the industry.

4.4 EXPLORATORY FACTOR ANALYSIS

Exploratory factor analysis was performed using SPSS with reference to the recommended processes as described in section 3.3. Only factor loadings with values above 0.3 were displayed (Coakes & Steed, 2001, p. 158; Khong & Richardson 2003) (see *Appendix 4*) whilst only factor loadings above 0.5 were considered significant[39] based on the concept of statistical power given the sample size between 120 and 150 (Hair et al., 1998, p.112). These insignificant variables were c3, b5, b6, b13, b16 and they were dropped for further analysis. Exploratory factor analysis had provided insight to the researchers in regard to how many factors could be extracted for each construct based on the designed survey instrument. Factors extraction method followed latent root criterion whereby only factors with eigenvalues greater than 1 were considered significant (Hair et al., 1998).

[39] "Significance is based on a .05 significance level (α), a power level of 80 percent, and standard errors assumed to be twice those conventional crrelation coefficients" (see Hair et al., 1998, p.112).

The results showed nine factors were extracted for all the variables. These nine factors together accounted for almost 70 percent of the data variance. Examination of the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy showed a coefficient of 0.821, which was above the acceptable level of 0.7 (Hair et al., 1998, p. 99). The Bartlett's test of sphericity, which is a statistical test for the overall significance of all correlations within a correlation matrix (Hair et al., 1998, p.88), was also statistically significant at $\alpha = 0.01$ level. Out of the nine factors, two factors were extracted for *ERM implementation intensity* (denoted I1 and I2), two factors for *implementation challenge* (denoted C1 and C2), and five factors were extracted for *perceived ERM benefit measures* (denoted B1, B2, B3, B4, and B5). The nine factors extracted and their respective indicators are shown in Table 4.9.

Table 4.9: Nine-factor model extracted using
Principal Component Analysis and Varimax Rotation.

Variable	Construct I1	Construct I2	Construct B1	Construct B2	Construct B3	Construct B4	Construct B5	Construct C1	Construct C2
i1	0.649								
i2		0.601							
i3		0.686							
i4		0.641							
i5		0.579							
i7		0.639							
i8		0.796							
i9		0.537							
i10	0.573								
i11	0.666								
i12	0.770								
i13	0.633								
i14	0.577								
b1			0.780						
b2			0.688						
b3			0.623						
b4			0.631						
b7				0.760					
b8				0.666					
b9					0.681				
b10					0.751				
b11					0.573				
b12						0.567			
b14							0.772		
b18						0.773			
c1									0.573
c2									0.829
c5								0.728	
c6								0.739	
c7								0.830	
c8								0.612	

The result indicated a minor departure from that of anticipated by the researchers in which three factors for ERM implementation intensity and four factors for perceive ERM benefit measures had been expected based on the literature review.

4.5 RELIABILITY OF THE FACTORS' SCALES

After factors were extracted from the exploratory factor analysis, reliability test was conducted again on the respective factor scale. Statistically, it involved the item-total correlation for variables within a scale or factor. Table 4.10 presents the results of the item-total correlation. The cut-off point of an acceptable item-total correlation is 0.5 or above (Hair et al, 1998, p 118). As Table 4.10 indicates, variables b12, b18, and c8, failed to attain item-total correlation above the 0.5 threshold. Hence, these variables were omitted for further analysis. Note that variable c5 initially did not make the cut for the 0.5 threshold for factor C1, subsequent scale reliability test after deleting c8 however, revealed that c5's Cronbach's alpha in factor C1 was 0.504. As such we retained c5 in factor C1 for further analysis.

Table 4.10: Results of exploratory factor analysis and item-total correlation test

No	Variable	Loading	Item-total correlation	Factor	No	Variable	Loading	Item-total correlation	Factor
1	i1	0.649	0.504	I1	15	b2	0.688	0.720	B1
2	i10	0.573	0.552	I1	16	b3	0.623	0.680	B1
3	i11	0.666	0.532	I1	17	b4	0.631	0.653	B1
4	i12	0.770	0.664	I1	18	b7	0.760	0.598	B2
5	i13	0.633	0.524	I1	19	b8	0.666	0.598	B2
6	i14	0.577	0.577	I1	20	b9	0.681	0.577	B3
7	i2	0.601	0.584	I2	21	b10	0.751	0.618	B3
8	i3	0.686	0.664	I2	22	b11	0.573	0.593	B3
9	i4	0.641	0.650	I2	23	**b12**	0.567	**0.402***	B4
10	i5	0.579	0.594	I2	24	**b18**	0.773	**0.402***	B4
11	i7	0.639	0.541	I2	25	**c5**	0.728	**0.491***	C1
12	i8	0.796	0.742	I2	26	c6	0.739	0.600	C1
13	i9	0.537	0.538	I2	27	c7	0.830	0.572	C1
14	b1	0.780	0.664	B1	28	**c8**	0.612	**0.450***	C1

* Not significant (< 0.5)
* Excluded for further analysis

Table 4.11 shows the Cronbach's alpha statistic for the factor scales of the retained variables. The Cronbach's alpha value for each factor scale is above the recommended value of 0.7, indicating the scales' internal consistency (Hair et al, 1998, p 118).

Table 4.11: Cronbach's Alpha statistic for factor scale

Factor	Indicators	No of items	Scale Cronbach's Alpha
I1	i1, i10, i11, i12, i13, i14	6	0.804
I2	i2, i3, i4, i5, i7, i8, i9	7	0.855
B1	b1, b2, b3, b4	4	0.844
B2	b7, b8	2	0.748
B3	b9, b10, b11	3	0.764
C1	c6, c7, c8	3	0.718

After two rounds of data reduction process, i.e. through exploratory factor analysis' factor loadings analysis and item-total correlation's coefficient analysis, the study had eliminated a total of eleven variables. This means only twenty five variables were retained for further analysis.

4.6 CONFIRMATORY FACTOR ANALYSIS

As described in section 3.11, confirmatory analysis provided total control over which variables describe the factors. Hair et al. (1998, p.111) suggested that factor loading 0.5 and above to be considered as *practically significant* with the sample size 100 or larger[40]. As Hair et al. (1998) put it, "the researcher should realize that extremely high loadings (.80 and above) are not typical and that the practical significance of the loadings is an important criterion" (p. 111). Hence, with reference to the data reduction criterion discussed thus far, coupled with the guidance from the literature review, we retain altogether twenty five variables which make up of six remaining factors for further analysis. These factors also known as latent constructs after confirmatory factor analysis. Variables were assigned to the specific constructs shown in Table 4.12.

[40] "a .50 loading denotes that 25 percent of the variance is accounted for by the factor. The loading must exceed .70 for the factor to account for 50 percent of the variance" (see Hair et al., 1998, p.111).

Table 4.12: The indicators extracted of the respective constructs for SEM analysis

Construct I1:	
i1	Provides common understanding of the objectives of each ERM initiative
i10	ERM strategy is aligned with corporate strategy
i11	Identifies key risk indicators (KRIs)
i12*	Integrates risk with key performance indicators (KPIs)
i13	Aligns ERM initiatives to business objectives
i14	Provides the rigor to identify and select risk responses (i.e. risk- avoidance, reduction, sharing and acceptance)
Construct I2:	
i2	Provides common terminology and set of standards of risk management
i3	Provides enterprise-wide information about risk
i4	Integrates risk with corporate strategic planning
i5	Reduces risk of non-compliance
i7	Quantifies risk to the greatest extent possible
i8*	Integrated across all functions and business units
i9	Enables everyone understands his/her accountability
Construct B1:	
b1*	Enhances enterprise's ability to take appropriate risks in value creation
b2	Strengthens management's confidence in business operations
b3	Creates smooth governance procedures
b4	Improves monitoring of enterprise performance
Construct B2:	
b7*	Facilitates reporting to regulators
b8	Improves communicating to stakeholders / shareholders
Construct B3:	
b9	Enhances managers' ability to think entrepreneurially and innovatively
b10*	Boosts enterprise's profitability
b11	Assists in meeting enterprise's strategic goals
Construct C1:	
c5	There is strong competition from other type of management techniques to be implemented
c6	There is wide discrepancy between expectation and practices in ERM implementation
c7*	There is inadequate technology support

**Highest loading in the construct (factor)*

4.7 NAMING OF THE FACTORS

With the derivation of the above six-factor solution (i.e. two ERM implementation intensity constructs, *I1, I2*; three perceived benefit measures constructs, *B1, B2, B3*; and one implementation challenge factors, *C1*, we could attempt to name those factors in order to assign some meaning to each of it. Naming of the factors was not done arbitrarily. The process involved "substantive interpretation of the pattern of factor loadings for the variable" (Hair et al., 1998, p.126). It also helps with a prior knowledge of what to expect after extensive literature review in order to give a bigger picture of what those constructs represent. As a result, we name the constructs as in Table 4.13

Table 4.13: Naming of the Factors

Factor	Construct name
I1	performance & target setting
I2	business function & process integration
B1	risk taking capability & confidence building
B2	effective stakeholders communication
B3	enterprise & managerial excellence
C1	implementation challenges

4.8 MODELING AND HYPOTHESIS TESTING

4.8.1 SEM Stage 1: Developing a Theoretically Based Model

This section puts forth an ERM model to examine how the two factors of ERM implementation intensity affect the three factors of perceived ERM benefit measures of Malaysian public listed companies or PLCs. At the same time, our model also investigates if the PLCs find the one factor of ERM implementation challenge significantly affect their ERM implementation intensity. The examination is performed using structural equation modeling (SEM) technique. All of the above factors are extracted from factor analyses discussed in the previous section which altogether comprised of 25 variables. These extracted variables are shown in Table 4.12.

In our model, constructs C1 is the exogenous constructs while constructs I1, I2, B1, B2, and B3 are the endogenous constructs. In order to examine the relationships between the dimensions of (1) the ERM implementation intensity and the perceived ERM benefit measures, (2) ERM implementation challenge and ERM implementation intensity, the following hypotheses are tested:

H_0: The overall model has a good fit

H_a: The overall model does not have a good fit

H_{1A}: Construct I1 has a positive effect on Construct B1.

H_{1B}: Construct I1 has a positive effect on Construct B2.

H_{1C}: Construct I1 has a positive effect on Construct B3.

H_{1D}: Construct I2 has a positive effect on Construct B1.

H_{1E}: Construct I2 has a positive effect on Construct B2.

H_{1F}: Construct I2 has a positive effect on Construct B3.

H_{2A}: Construct C1 has a negative effect on Construct I1.

H_{2B}: Construct C1 has a negative effect on Construct I2.

Note that hypotheses H_{1A}, H_{1B}, H_{1C}, H_{1D}, H_{1E}, H_{1F} are subsets of hypothesis H_1 which hypothesizes that *ERM Implementation Intensity* has a positive effect on *Perceived ERM Benefit Measures.* On the other hand, hypotheses H_{2A} and H_{2B} are subsets of hypothesis H_2 which hypothesizes that *Implementation Challenge* has a negative effect on *ERM Implementation Intensity.* Hypotheses H_1 and H_2 are first defined in section 3.3.1.

In SEM analysis, we looked forward **not** to reject the null hypothesis. The null hypothesis is written in that there is no significant difference between the observed model and the estimated model (Garson, 2008). A model with a good fit indicates that the overall model can predict the observed variance-covariance matrix (Hair et al, 1998). Hypotheses H_{1A} to H_{1F} are developed to investigate the impact of the two dimensions (factors) of ERM implementation intensity on the three aspects of perceived ERM benefit measures respectively. Accepting any of the hypotheses would mean that the particular dimension of the implementation intensity would have a positive impact on the corresponding perceived benefit measure. On the other hand, hypotheses H_{2A} and H_{2B} examine the negative impact of ERM implementation challenge on the implementation intensity. Accepting any of these hypotheses would mean that implementation challenge would have a negative impact on the corresponding implementation intensity dimension.

From the results of investigating these hypotheses, the researcher could establish a generalization for the Malaysian PLCs, of the effects of successful ERM implementation towards the perceived ERM benefit (value enhancing) measures, and that of the negative impact of ERM implementation challenge towards its implementation intensity.

4.8.2 SEM Stage 2: Constructing a path Diagram of Causal Relationships

Figure 4.7 and 4.8 present two path diagrams portraying the predictive relationships among the constructs under discussion (see *Appendix 5* for actual output of full path diagram from software AMOS). For instance, Figure 4.7 depicts that Construct C1 will impact constructs I1 and I2. The latter constructs in turn, will affect B1, B2, and B3.

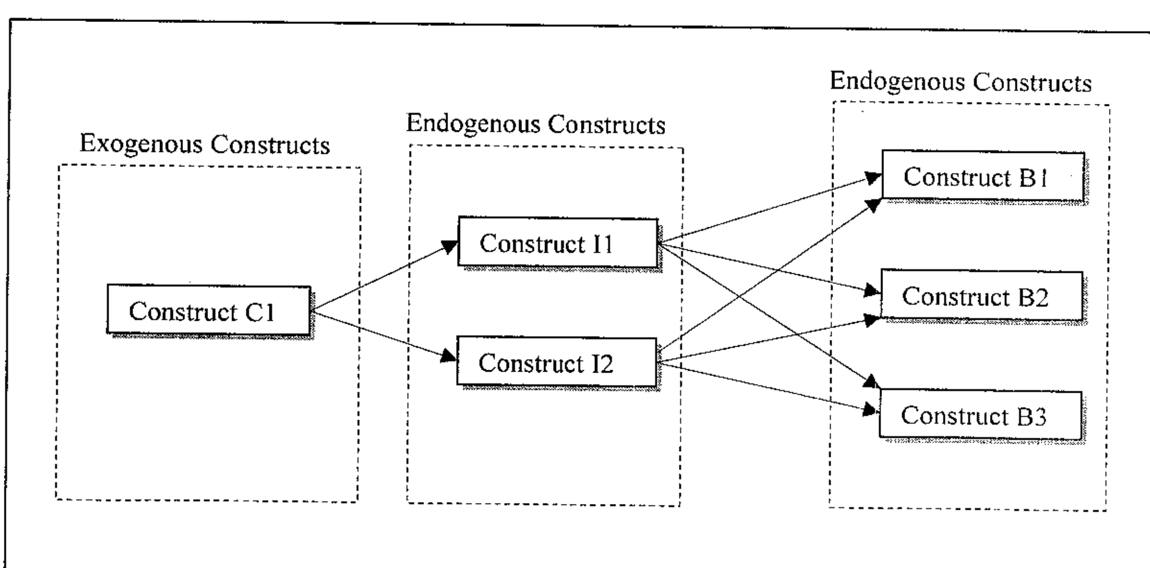


Figure 4.7: Brief path diagram of predictive and associative relationships

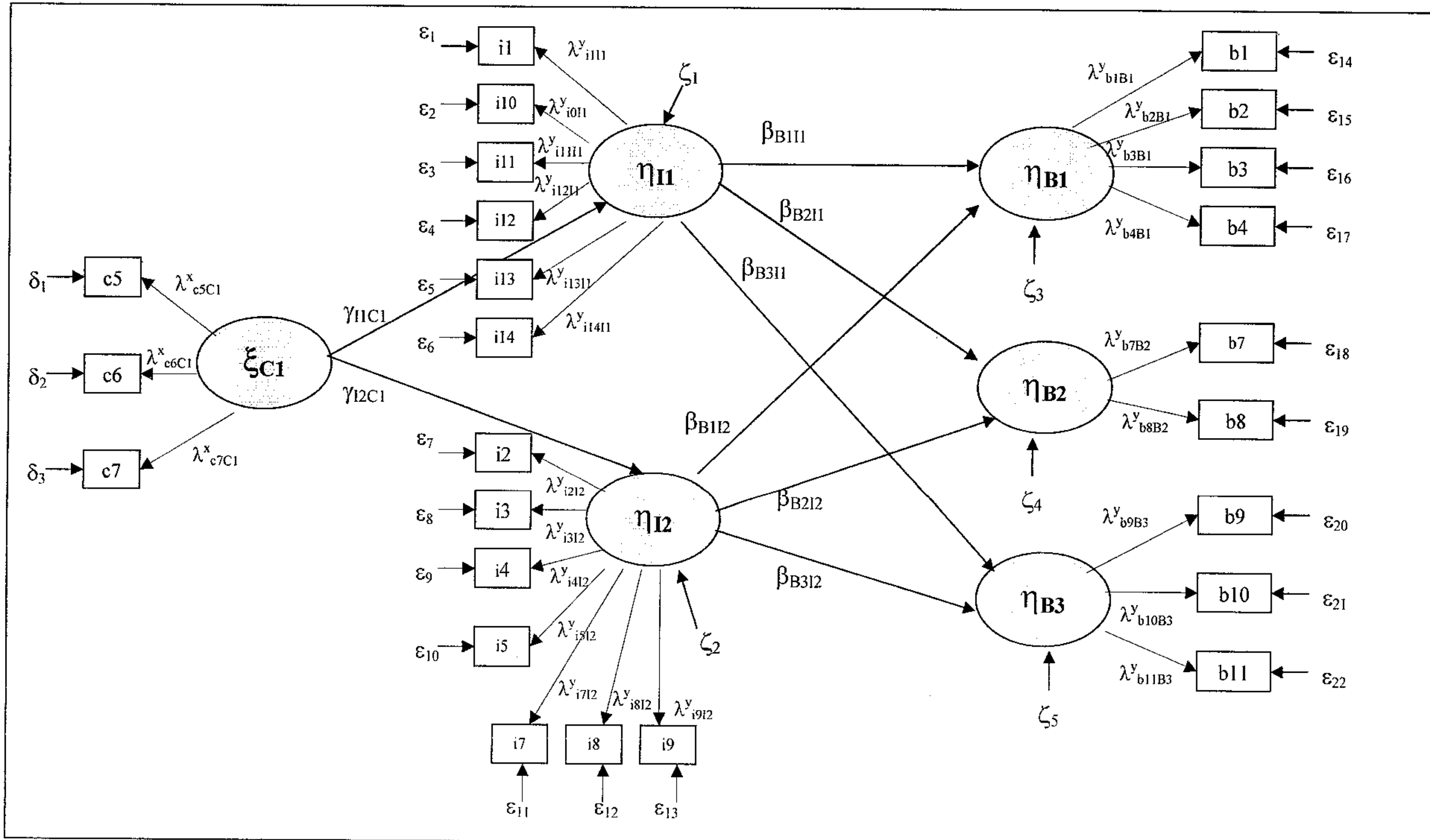


Figure 4.8: Full path diagram of SEM

Where:

- Beta (β_{nn}) is the relationships of endogenous constructs to endogenous constructs
- Gamma (γ_{nm}) is the relationships of exogenous constructs to endogenous constructs
- Phi (ϕ_{mm}) is the correlation among exogenous constructs
- Lambda-X (λ^{x}_{pm}) is the loadings of exogenous indicators
- Lambda-Y (λ^{y}_{qn}) is the loadings of endogenous indicators
- ξ_m is the exogenous construct
- η_n is the endogenous construct
- X is the exogenous indicator
- Y is the endogenous indicator
- m is number of exogenous constructs
- n is number of endogenous constructs
- p is number of exogenous construct indicators
- q is number of endogenous construct indicators
- ζ, δ and ε are measurement errors

In Figure 4.8, construct C1 is labeled ξ_{C1}, whilst constructs I1, I2, B1, B2, and B3 are labeled η_{I1}, η_{I2}, η_{B1}, η_{B2}, and η_{B3} respectively. In addition to the above, Figure 4.8 also depicts the indicators (manifest variables) for each latent construct. The indicators for each latent construct were derived (extracted) through confirmatory factor analysis as previously discussed. For instance, ξ_{C1} is measured and represented by three indicators labeled as c5, c6, and c7. In addition, each indicator variable is associated with a measurement error, i.e. ζ, ε or δ. For instance, ζ is associated with the endogenous construct while ε and δ are associated with the indicator variables (endogenous and exogenous respectively).

4.8.3 *SEM Stage 3: Converting the Path Diagram into a Set of Structural and Measurement Models*

The path diagram in Figure 4.7 provides the basis for specification of the structural equations and the proposed correlation (1) between exogenous constructs and (2) between structural equations. From the path model, we construct a series of structural equations (one for each endogenous construct) to constitute the structural model. It follows with the specification of measurement model whereby indicators are assigned to each construct (exogenous and endogenous). The generic forms of the structural and measurement equations are as follows:

Structural Model Equations:

Endogenous Construct		Exogenous Construct		Endogenous Construct		Error
η	=	$\gamma_{nm}\,\xi$	+	$\beta_{nn}\,\eta$	+	ζ

Measurement Model Equations:

Exogenous Indicator		Exogenous Construct		Error
X	=	$\lambda^{x}{}_{pm}\,\xi$	+	δ

Endogenous Indicator		Endogenous Construct		Error
Y	=	$\lambda^{y}{}_{qn}\,\xi$	+	ε

Structural Equation Correlations among Exogenous Constructs:

	Exogenous Constructs		
	ξ_1	ξ_2	ξ_n
ξ_1	–		
ξ_2	ϕ_{21}	–	
ξ_n	ϕ_{n1}	ϕ_{n2}	–

Where

- Beta (β_{nn}) is the relationships of endogenous to endogenous constructs
- Gamma (γ_{nm}) is the relationships of exogenous to endogenous constructs
- Phi (ϕ_{mm}) is the correlation among exogenous constructs
- Lambda-X ($\lambda^{x}{}_{pm}$) is the loadings of exogenous indicators
- Lambda-Y ($\lambda^{y}{}_{qn}$) is the loadings of endogenous indicators
- ξ_m is the exogenous construct
- η_n is the endogenous construct
- X is the exogenous indicator
- Y is the endogenous indicator
- *m* is number of exogenous constructs
- *n* is number of endogenous constructs
- *p* is number of exogenous construct indicators
- *q* is number of endogenous construct indicators
- ζ, δ and ε are measurement errors

Source: Hair, J.F., Anderson, R.E., Tatham, R.L. & Black, W.C. (1998). *Multivariate Analysis (5th Ed)*. New Jersey: Prentice Hall.

4.8.3.1 Specifying Structural Equation

The specification of a structural equation for each endogenous construct is to specify the relationships of them to both the exogenous constructs and the other endogenous constructs (Hair et al., 1998). In our model, we have five endogenous constructs and one exogenous construct. Out of the five endogenous constructs, two of them (η_{I1}, η_{I2}) are proposed to be the predictors for the other three endogenous constructs (η_{B1}, η_{B2}, η_{B3}). Apart from that, an exogenous construct (ξ_{C1}) is proposed to be the predictors for endogenous constructs (η_{I1}, η_{I2}) (see Figure 4.8).

4.8.3.2 Specifying the Measurement Model

The measurement model specifies the correspondence of indicators to constructs (Hair et al., 1998). The number of indicators measuring up the endogenous and exogenous constructs in our model is shown in Table 4.14 below. The indicators measuring up each endogenous and exogenous construct are reflecting the dimensions discussed previously. The specific indicators corresponding to each construct have been presented in detail earlier in this chapter as well as the concepts of which have been discussed extensively earlier in the chapter.

Table 4.14: The measurement model

Construct	Endogenous / Exogenous	No. of indicators	Indicators
C1	Exogenous	3	c5, c6, c7
I1	Endogenous	6	i1, i10, i11, i12, i13, i14
I2	Endogenous	7	i2, i3, i4, i5, i7, i8, i9
B1	Endogenous	4	b1, b2, b3, b4
B2	Endogenous	2	b7, b8
B3	Endogenous	3	b9, b10, b11

In the measurement model equation, we retained the following variables: *i1, i2, i3, i4 ,i5, i7, i8, i9, i10, i11, i12, i13, i14, b1, b2, b3, b4, b7, b8, b9, b10, b11, c5, c6,* and *c7.* Among them, variables *c5, c6,* and *c7,* were assigned as exogenous indicators whilst *i1, i2, i3, i4 ,i5, i7, i8, i9, i10, i11, i12, i13, i14, b1, b2, b3, b4, b7, b8, b9, b10,* and *b11* as endogenous indicators. Table 4.15, 4.16, and 4.17 present the complete mathematical equations for our structural and measurement models.

Table 4.15: Structural Model Equations for the Path Diagram

Endogenous Construct	Exogenous Construct	Endogenous Construct					Error
	ξ_{C1}	η_{I1}	η_{I2}	η_{B1}	η_{B2}	η_{B3}	
$\eta_{I1} =$	$\gamma_{I1C1}\xi_{C1} +$						ζ_1
$\eta_{I2} =$	$\gamma_{I2C1}\xi_{C1} +$						ζ_2
$\eta_{B1} =$		$\beta_{B1I1}\eta_{I1} +$	$\beta_{B1I2}\eta_{I2} +$				ζ_3
$\eta_{B2} =$		$\beta_{B2I1}\eta_{I1} +$	$\beta_{B2I2}\eta_{I2} +$				ζ_4
$\eta_{B3} =$		$\beta_{B3I1}\eta_{I1} +$	$\beta_{B3I2}\eta_{I2} +$				ζ_5

Table 4.16: Exogenous Measurement Model Equations for the Path Diagram

Exogenous Indicator	Exogenous Constructs		Error
	ξ_{C1}		
c5 =	$\lambda^{x}_{c5C1}\xi_{C1}$	+	δ_1
c6 =	$\lambda^{x}_{c6C1}\xi_{C1}$	+	δ_2
c7 =	$\lambda^{x}_{c7C1}\xi_{C1}$	+	δ_3

Table 4.17: Endogenous Measurement Model Equations for the Path Diagram

Endogenous Indicator	Endogenous Constructs η_{I1}	η_{I2}	η_{B1}	η_{B2}	η_{B3}		Error
i1 =	$\lambda^y_{i1I1}\eta_{I1}$					+	ε_1
i10 =	$\lambda^y_{i10I1}\eta_{I1}$					+	ε_2
i11 =	$\lambda^y_{i11I1}\eta_{I1}$					+	ε_3
i12 =	$\lambda^y_{i12I1}\eta_{I1}$					+	ε_4
i13 =	$\lambda^y_{i13I1}\eta_{I1}$					+	ε_5
i14 =	$\lambda^y_{i14I1}\eta_{I1}$					+	ε_6
i2 =		$\lambda^y_{i2I2}\eta_{I2}$				+	ε_7
i3 =		$\lambda^y_{i3I2}\eta_{I2}$				+	ε_8
i4 =		$\lambda^y_{i4I2}\eta_{I2}$				+	ε_9
i5 =		$\lambda^y_{i5I2}\eta_{I2}$				+	ε_{10}
i7 =		$\lambda^y_{i7I2}\eta_{I2}$				+	ε_{11}
i8 =		$\lambda^y_{i8I2}\eta_{I2}$				+	ε_{12}
i9 =		$\lambda^y_{i9I2}\eta_{I2}$				+	ε_{13}
b1 =			$\lambda^y_{b1B1}\eta_{B1}$			+	ε_{14}
b2 =			$\lambda^y_{b2B1}\eta_{B1}$			+	ε_{15}
b3 =			$\lambda^y_{b3B1}\eta_{B1}$			+	ε_{16}
b4 =			$\lambda^y_{b4B1}\eta_{B1}$			+	ε_{17}
b7 =				$\lambda^y_{b7B2}\eta_{B2}$		+	ε_{18}
b8 =				$\lambda^y_{b8B2}\eta_{B2}$		+	ε_{19}
b9 =					$\lambda^y_{b9B3}\eta_{B3}$	+	ε_{20}
b10 =					$\lambda^y_{b10B3}\eta_{B3}$	+	ε_{21}
b11 =					$\lambda^y_{b11B3}\eta_{B3}$	+	ε_{22}

We do not see the instances where indicators should be correlated, thus no measurement error correlations are hypothesized. This assumption will hold true for the initial model as well as for the model modifications. The eight most important coefficients to be estimated in the structural equation are listed in Table 4.15; i.e. $\gamma_{I1C1}\xi_{C1}, \gamma_{I2C1}\xi_{C1}, \beta_{B1I1}\eta_{I1}$, $\beta_{B1I2}\eta_{I2}$, $\beta_{B2I1}\eta_{I1}$, $\beta_{B2I2}\eta_{I2}$, $\beta_{B3I1}\eta_{I1}$, and $\beta_{B3I2}\eta_{I2}$.

4.8.4 SEM Stage 4: Choosing The Type of Input Matrix and Estimating The Proposed Model

According to Hair et al. (1998, p.631), covariances would be the preferred input matrix type when testing a series of causal relationships. Furthermore, in theory testing, a variance-covariance matrix is essential. Once constructs are identified and the measurement model specified, the proposed model is estimated using AMOS. "Direct estimation", "Maximum likelihood estimation (MLE)", "standardized indicators scale" are chosen as criteria for the selected estimating process and procedure.

4.8.5 SEM Stage 5: Assessing The Identification of The Structural Model

As discussed in section 3.13.6, examining the identification of the structural model is crucial. This is done through the assessment of the degree of freedom (*df*) of the data matrix. Positive number of degree of freedom is desirable to ensure the highest generalizability of an over-identified model (Hair et al, 1998, p.608-609). As such, the higher the *df* the lower the identification problems. The results indicated that the *df* of our data matrix was 244. Therefore, there is no identification problem and the generalizability was high. In addition, evaluation of other indicators also suggests the identification problems of the structural model are minimal. The indicators are as follows:

(a) The standard errors are reasonably small (between 0.080 and 0.145).

(b) Correlations among constructs are below 0.90 (see Table 4.18).

(c) All except one construct are manifested by three or more indicators in the model[41] (see Figure 4.8).

4.8.6 SEM Stage 6: Evaluating Goodness-of-Fit Criteria

The evaluation of GFI begins with the examination of 'offending estimates' such as "negative error variances, standardized coefficients exceeding or very close to 1.0, or very large standard errors" (Hair et al, 1998, p.633; Khong & Richardson, 2003). The examinations reveal none of these problems (see Table 4.18, *Appendix 6* and *Appendix 7*).

[41] *These indications are based on the suggestions by Hair et al (1998, pp 609 – 610).*

Table 4.18: SEM Results: Standardized Parameter Estimates
for the Structural Model
[Structural Model Equation Coefficients (t values in brackets)]

Endogenous Construct		Exogenous Construct ξ_{C1}		Endogenous Construct η_{I1}		η_{I2}		Error
η_{I1}	=	-0.624 (-5.444)**	+					0.081
η_{I2}	=	-0.622 (-5.607)**	+					0.087
η_{B1}	=			0.458 (4.265)**	+	0.560 (5.196)**	+	0.168
η_{B2}	=			0.441 (3.582)**	+	0.377 (3.339)**	+	0.224
η_{B3}	=			0.563 (4.297)**	+	0.393 (2.130)**	+	0.252

**Significant at α = 0.01 level

As already discussed in section 3.13.7, the overall model fit of the proposed model is measured with three types of GFI measures, namely (1) absolute fit measures, (2) incremental fit measures and (3) parsimonious fit measures (see Table 4.19). These GFIs measure "the correspondence of the actual or observed" covariance input matrix "with that predicted from the proposed model" (Hair et al., 1998, p.611). We make reference to the recommended values (rule of thumb) of these GFIs by Hair et al. (1998), Garson (2008), Kenny (2003), and *AMOS Reference Guide*[42] (version 16.0.1) in interpreting the overall model fit. It is imperative to keep in mind, however, that the recommended values are just guideline rather than that which requires a strict adherence to in validating the proposed model. As Khong and Richardson (2003) put it, these GFI measures

[42] *AMOS Reference Guide* is contained in AMOS software version 16.0.1

guideline are not "mandatory axioms". Furthermore, no single GFI measure will hold exclusivity over the others in providing an authoritative interpretation. The recommended GFI values nonetheless, are important in determining the acceptability of the proposed model. At the very least, these GFI measures help researchers to conclude if the proposed model fits the existing observed variance-covariance well.

Table 4.19: GFI Measures for SEM

	Recommended Values	*Actual Values*	*Recommended values met*
Absolute Fit Measures			
Chi-square (χ^2) of estimated model	-	518.754	-
df	-	267	-
χ^2 p-level	> 0.05	0.000	**No**
Goodness-of-fit index (GFI)	> 0.90	0.867	**No**
Root mean square residual (RMSR)	< 0.08	0.076*	**Yes**
Root mean square error of approximation (RMSEA)	< 0.08	0.068*	**Yes**
Incremental Fit Measures			
Independence model χ^2	-	1572.179	-
Independence model *df*	-	300	-
Adjusted GFI (AGFI)	> 0.90	0.816	**No**
Normed fit index (NFI)	> 0.90	0.870	**No**
Relative fit index (RFI)	> 0.90	0.829	**No**
Incremental fit index (IFI)	> 0.90	0.917*	**Yes**
Tucker-Lewis coefficient (TLI) / (NNFI)	> 0.90	0.902*	**Yes**
Parsimonious Fit Measures			
Normed χ^2 (χ^2/df)	$1 < \chi^2/df < 2$	1.943*	**Yes**
Parsimonious normed fit index (PNFI)	> 0.60	0.596	**No**
Akaike information criterion (AIC)	the lesser the better	634.754	-
Comparative fit index (CFI)	> 0.90	0.802	**No**
Parsimony adjusted CFI (PCFI)	> 0.60	0.714*	**Yes**
Parsimony goodness of fit index (PGFI)	> 0.60	0.630*	**Yes**
Sample size (N)	100 < N < 150	122*	**Yes**

* *value falls within the recommended range*

Referring to Table 4.19, the model chi-square (χ^2 *p*-level) is significant indicating lack of satisfactory model fit. The significant chi-square statistic means that the given model's covariance structure is significantly different from the observed covariance matrix (Garson, 2008). However, the model chi-square statistic is prone to Type II error. It is also bias against the size of the correlations in the model, meaning that the larger the correlations, the poorer the fit (Kenny, 2003). This is confirmed by the results of parameter estimates of the structural and measurement models (see Table 4.18 and Appendix 5). It is due to these short comings of chi-square statistic that alternative measures of fit have been developed (Kenny, 2003). Garson (2008) asserted that if other model fit measures support the model, researchers could discount a negative model chi-square for the overall model fit interpretation. Apart from the model chi-square statistics, the other *absolute* fit measures such as the RMSR and RMSEA indices indicate satisfactory model fit. The GFI measure, however, was just slightly below the recommended value of 0.9.

Among the *incremental* fit measures, the IFI and TLI indices show satisfactory model fit whilst the AGFI, NFI, and RFI were marginally below the recommended value (see Table 4.19).

On the other hand, the *parsimonious* fit measures present acceptable overall model fit. All except the PNFI and CFI measures, which are just slightly below the recommended values, indicate satisfactory model fit.

The overall results of the absolute, incremental, and parsimonious model fit analysis discussed above can be concluded to suggest marginally acceptable model fit, indicative of having a room for model modification. As such, at this stage there seems to have some evidence to reject H_a (*The overall model does not have a good* *fit*) and to accept the null hypothesis, H_0 (*The overall model has a good fit*), of our ERM practical SEM model. Nevertheless, in striving for the best, this study makes some modification to the structural relationships of the initial proposed model in an attempt to improve the overall model fit. The model modification is discussed in the following section.

4.8.7 SEM Stage 7: Interpreting and Modifying the Model

As discussed in section 3.11, test on the measurement model in SEM is a form of confirmatory factor analysis (CFA). As Hair et al. (1998) noted that the objectives of CFA are two fold, firstly is to verify the proposed factor structure and secondly, is to examine if any significant modifications are needed. Examination on the SEM results indicates that the factor loadings and correlation coefficients of all indicators (variables) to their respective assigned constructs are significant. As such, this finding confirms the results to the factor analysis on the same variables done earlier.

Examination on the structural (path) coefficients reveals that all causal relationships are significant. Table 4.20 displays the results of the causal relationships of the structural model:

Table 4.20: Overall Standardized Parameter Estimates for the Structural Model

Construct Associations	Significance Level	Parameter Estimates (PE)	t-value of structural effect	p-value	Significant (Yes/No)
ξ_{C1} with η_{I1}	0.01	-0.624	-5.444	0.000***	Yes
ξ_{C1} with η_{I2}	0.01	-0.622	-5.607	0.000***	Yes
η_{I1} with η_{B1}	0.01	0.458	4.265	0.000***	Yes
η_{I1} with η_{B2}	0.01	0.441	3.582	0.000***	Yes
η_{I1} with η_{B3}	0.01	0.563	4.297	0.000***	Yes
η_{I2} with η_{B1}	0.01	0.560	5.196	0.000***	Yes
η_{I2} with η_{B2}	0.01	0.377	3.339	0.000***	Yes
η_{I2} with η_{B3}	0.01	0.365	3.393	0.000***	Yes

****Significant at all level*

From the results in Table 4.20, we conclude the followings:

4.8.7.1 Exogenous Construct C1

Results showed that at all significance level, Construct C1 has a negative and significant association with Construct I1 (parameter estimate (PE) = -0.624; t = -5.444; p = 0.000). Similarly, at all significance level, this construct also has a negative and significant association with Construct I2 (PE = -0.622; t = -5.607; p = 0.000).

4.8.7.2 Endogenous Construct I1

At all significance level, Construct I1 has a positive and significant association with Construct B1 (PE = 0.458; t = 4.265; p = 0.000), B2 (PE = 0.441; t = 3.582; p = 0.000), and B3 (PE = 0.563; t = 4.297; p = 0.000).

4.8.7.3 *Endogenous Construct I2*

At all significance level, Construct I2 has a positive and significant association with Construct B1 (PE = 0.560; t = 5.196; p = 0.000), B2 (PE = 0.377; t = 3.339; p = 0.000), and B3 (PE = 0.365; t = 3.393; p = 0.000).

4.8.7.4 *Model Re-Specification*

The examination of the proposed model's goodness-of-fit measures discussed in section 4.8.6 turned out to be slightly lack of satisfactory. This had prompted us to explore modifying the proposed (structural) model (see Figure 4.9) in an attempt to obtain a better overall model fit indices.

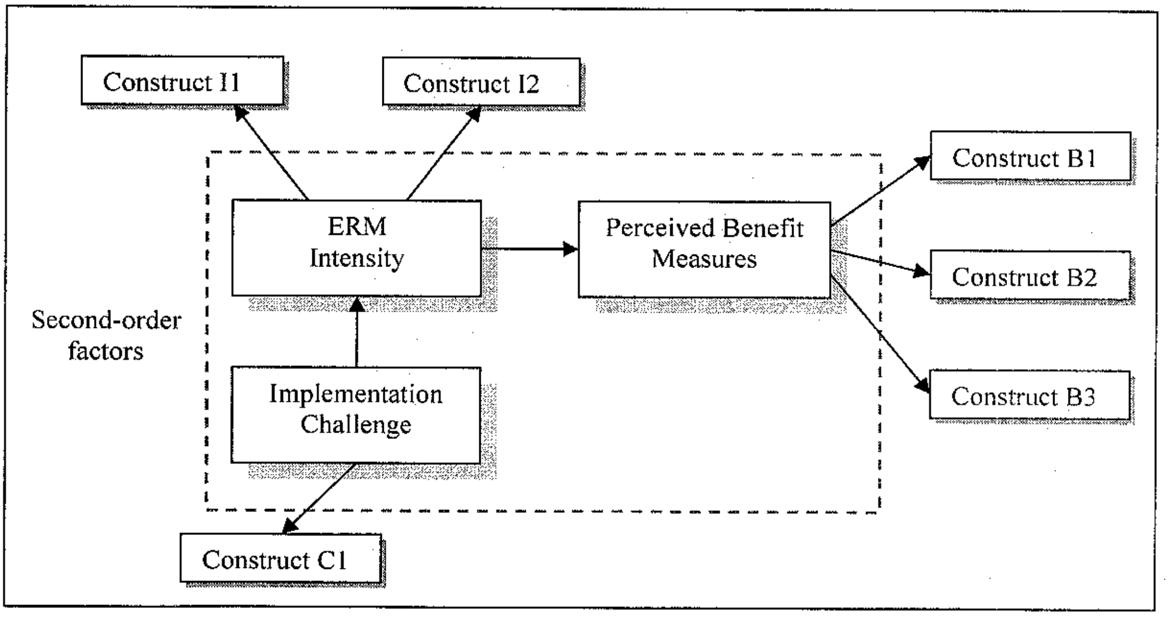


Figure 4.9: Model Re-specification -Path Diagram of a Second-Order Factor Analysis Model

Figure 4.9 above portrays a path diagram of a second-order factor analysis Model (see *Appendix 8* for a detailed path diagram). As elaborated in sections 3.1 and 3.2 in relation to the ERM conceptual and practical frameworks, our factor model as depicted by Figure 4.7 and 4.8 can be remodeled for a "higher-model". The factor model shown in Figure 4.7 or 4.8 is known as a *first-order factor model.* Although correlated, these factors in the first-order factor model are assumed to be separated (Hair et al., 1998, p.625). The modified model shown in Figure 4.9 is a higher-order factor model and is known as a "second-order" factor model. As depicted in Figure 4.9, our modified model now includes three additional constructs namely, *ERM Intensity, Implementation Challenge*, and *Perceived Benefit Measures*. These three constructs (second-order factors), are constructs with several facets or dimensions manifested by their respective first-order factors. For instance, construct *ERM Intensity* has two dimensions manifested by constructs I1 and I2. Likewise, constructs B1, B2, and B3 are the multiple facets of a higher-order construct named *Perceived Benefit Measures* (see *Appendix 9* for output from AMOS software of full path diagram of the modified model). This first- and second- order factor relationship can be obtained through factor analyzing the factor correlation matrix of the first-order factors itself (see section 3.12) or on a priori grounds (Hair et al., 1998; Suhr, 2009; Arnau, 1998; *AMOS Reference Guide*, version 16.0.1).

4.8.7.5 Results of Model Re-specification

Table 4.21 tabulates the results of model fit analysis of the modified model. Comparison of the goodness-of-fit measures between the modified and the proposed model are also given. As indicated in Table 4.21, the goodness-of-fit measures at all fronts, namely the absolute-, incremental-, and parsimonious- fit measures show a marked improvement. Further more, all goodness-of-fit measures except NFI and RFI meet the recommended values. Even then, the NFI and RFI values are only slightly below the recommended value of 0.90. As such, we can conclude from the rather satisfactory overall model fit measures that the modified model is structurally more superior.

Table 4.21: Comparison of GFI Measures between proposed and modified models

	Recommended Values	*Proposed Model Values*	*Modified Model Values*
Absolute Fit Measures			
Chi-square (χ^2) of estimated model	-	518.754	437.515*
df	-	267	246
χ^2 p-level	> 0.05	0.000	0.000
Goodness-of-fit index (GFI)	> 0.90	0.867	0.911*
Root mean square residual (RMSR)	< 0.08	0.076	0.063*
Root mean square error of approximation (RMSEA)	< 0.08	0.068	0.057*
Incremental Fit Measures			
Independence model χ^2	-	1572.179	2891.982
Independence model *df*	-	300	276
Adjusted GFI (AGFI)	> 0.90	0.816	0.901*
Normed fit index (NFI)	> 0.90	0.870	0.919*
Relative fit index (RFI)	> 0.90	0.829	0.909*
Incremental fit index (IFI)	> 0.90	0.917	0.928*
The Tucker-Lewis coefficient (TLI)[43]	> 0.90	0.902	0.918*
Parsimonious Fit Measures			
Normed χ^2 (χ^2/df)	$1 < \chi^2/df < 2$	1.943	1.779*
Parsimonious normed fit index (PNFI)	> 0.60	0.596	0.756*
Akaike information criterion (AIC)	the lesser the better	634.754	545.515*
Comparative fit index (CFI)	> 0.90	0.802	0.927*
Parsimony adjusted CFI (PCFI)	> 0.60	0.714	0.826*
Parsimony goodness of fit index (PGFI)	> 0.60	0.630	0.754*
Sample size (N)	100 < N < 150	122	122

* *indicates improvement from the proposed model*

[43] Also known as Non-normed Fit Index (NNFI)

Table 4.22 tabulates the structural (path) coefficients among the constructs of the modified model. The coefficients' respective significance values are also presented.

Table 4.22: Overall Standardized Parameter Estimates for the Structural (Modified) Model

Construct Associations			Parameter Estimates (PE)	t-value of	p-value structural effect
Implementation Challenge	→	ERM Intensity	-0.785	- (constrained to 1)	-
ERM Intensity	→	Perceived Benefit Measures	0.932	6.122	0.000***
ERM Intensity	→	I1	0.773	5.713	0.000***
ERM Intensity	→	I2	0.765	6.112	0.000***
Perceived Benefit Measures	→	B1	0.890	6.291	0.000***
Perceived Benefit Measures	→	B2	0.760	5.643	0.000***
Perceived Benefit Measures	→	B3	0.837	5.665	0.000***
Implementation Challenge	→	C1	0.276	- (constrained to 1)	-

****Significant at α=0.01 level*

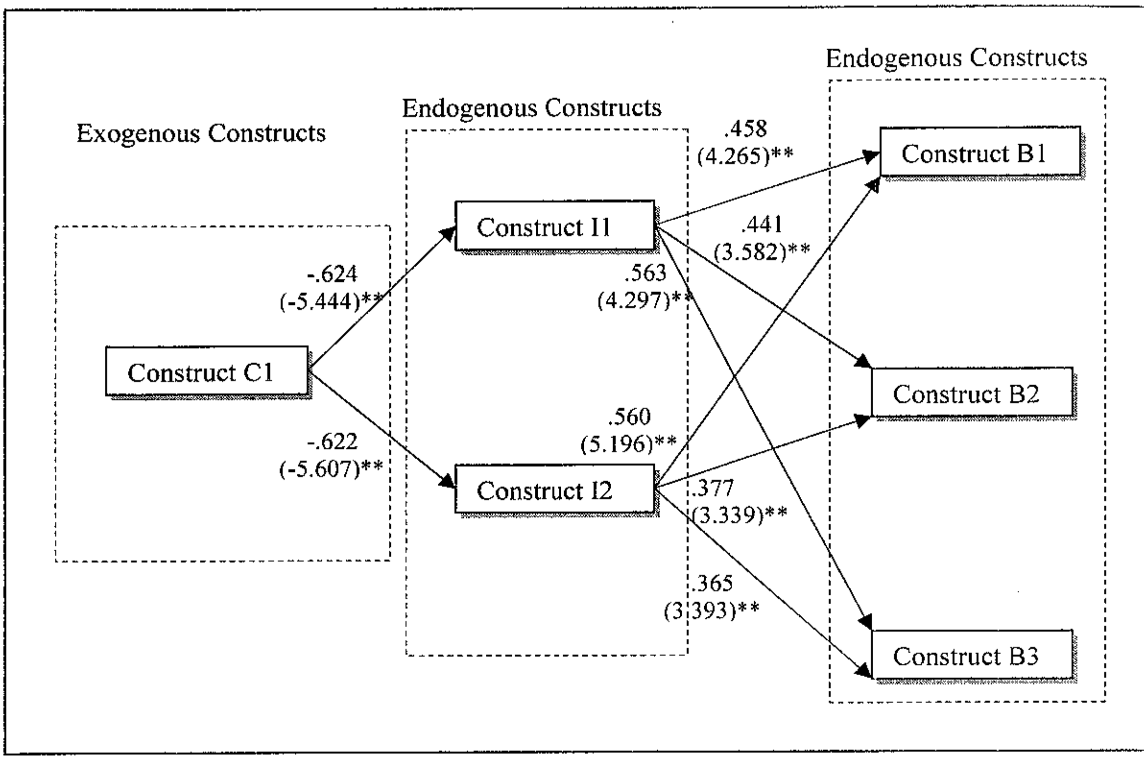
Examination of the measurement model (no change from that of proposed model) of the modified model indicated significant positive correlationship between the constructs and all their respective indicators (coefficient above 0.5). In effect, the coefficient values did not vary much from that of the proposed model. Hence, the second-order factor model in the modified model did not have any practical negative impact on the construct-indicators correlationship of the underlying measurement model.

In summary, the results of the model re-specification analysis were encouraging. The modified model not only delivered satisfactory overall model fit measures, its path coefficients also indicated strong associations among all constructs under examination. As such, we could conclude that the modified model is well supported by the concept, theory, and empirical data.

4.9 EXAMINING THE HYPOTHESES OF THE PROPOSED SEM MODEL

4.9.1 Introductory

We have discussed the interpretation of the hypotheses testing of the ERM practical framework's SEM model in sections 4.8.7.1 to 4.8.7.3. The results are encouraging on the underlying causal relationships among all constructs under examination as per the proposed model. The empirical results of our ERM practical model were in line with the conceptual and theoretical framework discussed in Chapter 2 and Chapter 3. For instance, results show that ERM implementation intensity (construct I1 & I2) has a significant positive impact on the perceived ERM benefit measures (construct B1, B2, and B3). In addition, ERM implementation challenge (construct C1) has a (albeit insignificant in the proposed model) negative effect of ERM implementation intensity (construct I1 and I2). Figure 4.10 presents the parameter estimates of the causal relationships and their respective t-values (in brackets) of the proposed model.



***Significance at α=0.01 level*

Figure 4.10: Path diagram and values of parameter estimates and t-values (in brackets) of the proposed model

Following are the hypotheses for our ERM practical framework's SEM model which have been presented in section 4.8.1:

H_0: The overall model has a good fit

H_a: The overall model does not have a good fit

H_{1A}: Construct I1 has a positive effect on Construct B1.

H_{1B}: Construct I1 has a positive effect on Construct B2.

H_{1C}: Construct I1 has a positive effect on Construct B3.

H_{1D}: Construct I2 has a positive effect on Construct B1.

H_{1E}: Construct I2 has a positive effect on Construct B2.

H_{1F}: Construct I2 has a positive effect on Construct B3.

H_{2A}: Construct C1 has a negative effect on Construct I1.

H_{2B}: Construct C1 has a negative effect on Construct I2.

The impacts of the two dimensions of ERM implementation intensity on the three dimensions of perceived ERM benefit measures are hypothesized by H_{1A}, H_{1B}, H_{1C}, H_{1D}, H_{1E}, H_{1F} whilst the negative effects of ERM implementation challenge on the two dimensions of ERM implementation intensity are represented by hypotheses H_{2A}, and H_{2B}.

Table 4.23: Hypotheses of the causal relationships among constructs in the proposed model

Causal Relationship	Parameter Estimates (PE)	t-value of structural effect	p-value	Significant at α=0.05 (Yes/No)	Hypothesis
η_{I1} with η_{B1}	0.458	4.265	***	Yes	H_{1A} Accepted
η_{I1} with η_{B2}	0.441	3.582	***	Yes	H_{1B} Accepted
η_{I1} with η_{B3}	0.563	4.297	***	Yes	H_{1C} Accepted
η_{I2} with η_{B1}	0.560	5.196	***	Yes	H_{1D} Accepted
η_{I2} with η_{B2}	0.377	3.339	***	Yes	H_{1E} Accepted
η_{I2} with η_{B3}	0.365	3.393	***	Yes	H_{1F} Accepted
ξ_{C1} with η_{I1}	-0.624	-5.444	***	Yes	H_{2A} Accepted
ξ_{C1} with η_{I2}	-0.622	-5.607	***	Yes	H_{2B} Accepted

****Significant at all level*

4.9.2 Examining H_0 and H_a

As indicated in Table 4.19, the chi-square (χ^2) value of 518.754 with 267 degree of freedom is statistically significant at the .000 significance level. Since the sample size of 122 did not overly affect the sensitivity of this measure, we shall conclude that significant differences exist between the observed and predicted variance-covariance matrix. However, given that the correlations in the proposed model are rather high, the χ^2 statistics could have been bias against this in giving a poor model fit (see explanation in section 4.8.6). The RMSR and RMSEA values were within the recommended value of less than 0.8 whilst GFI value of 0.867 fell just outside the acceptable range of 0.9. Apart from these absolute fit measures, other incremental fit measures i.e. IFI, TLI, and parsimonious fit measure i.e. AIC, PCFI, PGFI, indicated that the model is acceptable whilst indices like AGFI, NFI, RFI (incremental fit measures) and PNFI, CFI (parsimonious fit measures) fell just marginally outside the recommended values (see Table 4.19). As such H_a was rejected indicating that the proposed model has an acceptable fit.

4.9.3 Examining H_{1A}

The results indicated that **performance and target setting** (construct I1) of ERM implementation intensity (see the naming of constructs/factors in section 4.7) had a significant positive impact (parameter estimate (PE) = 0.458; t = 4.265; p = 0.000) on **risk taking capability and confidence building** (Construct B1) of the perceived ERM benefit measures. Since the significance was at all levels, there was strong evidence to assert H_{1A}. 'Integrating risk with key performance indicators', 'Identifying key risk indicators', 'Aligning ERM initiatives to business objectives', 'Providing common understanding of the objectives of each ERM initiative', 'ERM strategy is aligned with corporate strategy', and 'Providing the rigor to identify and select risk responses (i.e. risk- avoidance, reduction, sharing and acceptance)' were the essential elements in **performance and target setting** of ERM implementation intensity that would eventually contribute to **risk taking capability and confidence building** of the perceived ERM benefit measures. 'Enhancing enterprise's ability to take appropriate risks in value creation', 'Strengthening management's confidence in business operations', 'Creating smooth governance procedures', and 'Improving the monitoring of enterprise performance' were the specific perceived ERM benefit measures of **risk taking capability and confidence building**.

4.9.4 Examining H_{1B}

The results also showed that **performance and target setting** of ERM implementation intensity (construct I1) had a significant positive impact (PE = 0.441; t = 3.582; p = 0.000) on **effective stakeholders communication** (Construct B2). The significance was at all levels. As such, there was also strong evidence to accept H_{1B}. 'Facilitating the reporting to regulators' and 'Improving communication with stakeholders / shareholders' were the perceived benefit measures of **effective stakeholders communication.**

4.9.5 Examining H_{1C}

The results indicated that **performance and target setting** of ERM implementation intensity (construct I1) had a significant positive impact (PE = 0.441; t = 3.582; p = 0.000) on **enterprise and managerial excellence** (Construct B3). The significance was at all levels. As such, there was strong evidence to assert H_{1C}. 'Boosting enterprise's profitability', 'Enhancing managers' ability to think entrepreneurially and innovatively', and 'Assisting in meeting enterprise's strategic goals' were the specific perceived benefit measures of **enterprise and managerial excellence** as a result of this dimension (**performance and target setting)** of ERM implementation intensity.

4.9.6 Examining H_{1D}

The results indicated that **business function and process integration** (construct I2) of ERM implementation intensity had a significant positive impact (PE = 0.560; t = 5.196; p = 0.000) on **risk taking capability and confidence building** (Construct B1) of the perceived ERM benefit measures. Again, the significance was at all levels. As such, there was no reason to reject H_{1D}. The specific elements of **business function and process integration** dimension of ERM implementation intensity were 'Integrating ERM across all functions and business units', 'Providing common terminology and set of standards of risk management', 'Providing enterprise-wide information about risk', 'Integrating risk with corporate strategic planning', 'Reducing risk of non-compliance', 'Quantifying risk to the greatest extent possible', and 'Enabling everyone to understands his/her accountability'. The specific ERM benefit measures of **risk taking capability and confidence building** has been previously described in section 4.9.3.

4.9.7 Examining H_{1E}

The results showed that **business function and process integration** (construct I2) of ERM implementation intensity had a significant positive impact (PE = 0.377; t = 3.339; p = 0.000) on **effective stakeholders communication** (Construct B2) of the perceived ERM benefit measures. Again, the significance was at all levels. As such, there was strong evidence to assert H_{1E}. The specific implementation intensity elements of I2 and the benefit measures of B2 have been defined in section 4.9.6 and section 4.9.4 respectively.

4.9.8 *Examining H_{1F}*

Similar to that of H_{1E}, the results indicated that **business function and process integration** (construct I2) of ERM implementation intensity had a significant positive impact (PE = 0.365; t = 3.393; p = 0.000) on **enterprise and managerial excellence** (Construct B3) of the perceived ERM benefit measures. The significance was also at all levels. Again, there was no evidence to reject H_{1F}.

4.9.9 *Examining H_{2A}*

On the other perspective, the results found that ERM **Implementation Challenges** (construct C1) had a negative effect on **Performance and Target Setting** (construct I1) of ERM implementation intensity (PE = -0.624; t = -5.444; p = 0.000). The negative effect was statistically significant at all levels. Owing to this, H_{2A} was accepted. 'There is inadequate technology support', 'There is strong competition from other type of management techniques to be implemented', and 'There is wide discrepancy between expectation and practices in ERM implementation' were the essential elements in ERM **Implementation Challenges** that impeded the implementation intensity of **Performance and Target Setting**.

4.9.10 *Examining H_{2B}*

In tandem with that of H_8, the results also indicated that ERM **Implementation Challenges** (construct C1) had a negative and significant effect on **business function and process integration** (construct I2) of ERM implementation intensity (PE = -0.622; t = -5.607; p = 0.000). Hence, H_{2B} was also accepted.

4.10 EXAMINING THE MODIFIED SEM MODEL

Although the initial results of the overall goodness-of-fit analysis of the proposed model reveal that not all indices of the goodness-of-fit measures fall within the recommended range of values, subsequent goodness-of-fit measures of the modified model (with the inclusion of a second-order factor model) had nevertheless shown significant improvement of the values which indicated satisfactory and acceptable overall model fit (see Table 4.21 and Figure 4.11). All three goodness-of-fit criteria, i.e. absolute fit, incremental fit, and parsimonious fit showed superior measures. This essentially means that the modified model is able to predict the observed variance-covariance matrix (Hair et al., 1998, p.610). Note that the inclusion of the second-order factor model in the modified model (*highlighted by the dotted-line rectangular in Figure 4.11*) did not alter the underlying measurement model of the proposed model. The modified model had just explicitly clustered a number of related factors under a higher-order factor to offer a better perspective for more generalizability of the overall model (Arnau, 1998). Figure 4.11 also depicts the structural coefficients for all causal paths. All coefficients are significance at all levels (p-value = .000). Note that all paths have positive parameters except that of between **Implementation Challenge** and **ERM Intensity**, indicating that the higher the challenges faced in the implementation environment, the lower the ERM implementation intensity would be.

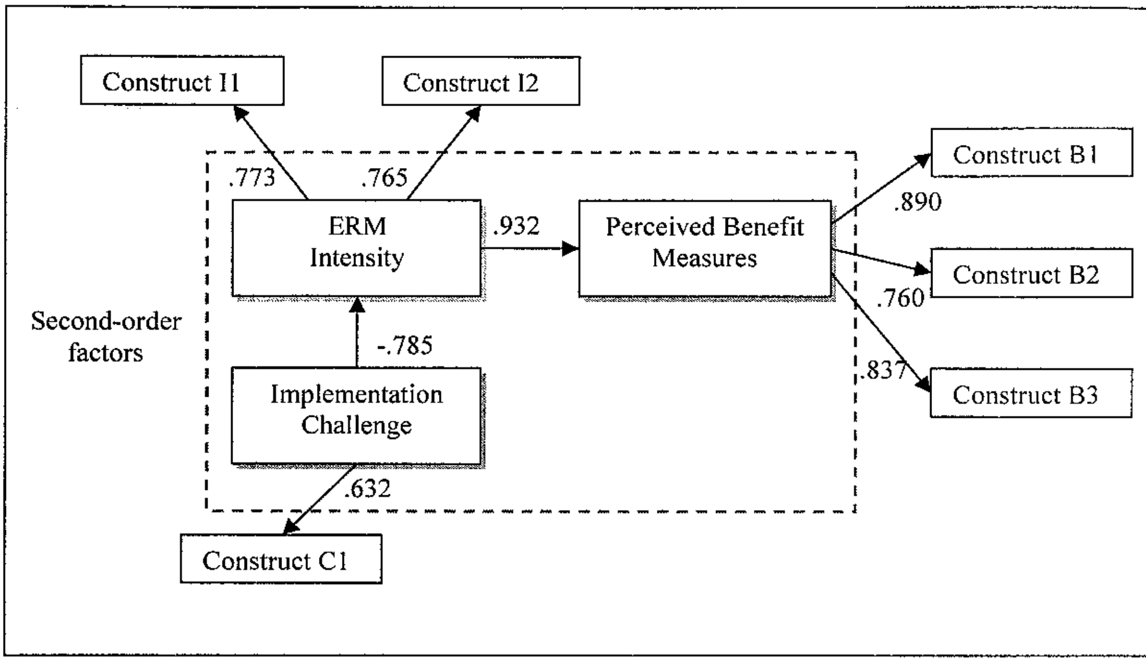


Figure 4.11: Path diagram and values of parameter estimates (structural coefficients) of the modified model

4.11 EXAMINING THE ERM VALUE MAXIMIZATION HYPOTHESES

4.11.1 Introductory

The review of literature in chapter 2 presented a number of theories in regard to the value maximization justification for engaging in enterprise risk management particularly in the area of managing unsystematic risk of the firms. Evidences were also presented lending support to the argument of positive effect for managing firms' (unsystematic) risk. The proposition for implementing ERM program in order to enhance shareholders value is against the backdrop of the neo-classical finance theory which postulates that managing firms' specific risk is of no value to the shareholders.

In view of the above, this study tested hypotheses H_3, H_4, H_5, H_6, H_7, H_8, and H_9 in an attempt to empirically examine the pertinent value maximization theories with data represented through the public listed companies on the Bursa Malaysia. The testing of hypotheses H_3, H_4, H_5, H_6, H_7, H_8, and H_9 involved bivariate correlation test with *ERM Implementation* being the independent variable. *ERM Implementation* was presented as a construct and it was measured by 14 variables (statements) contained in the questionnaire (see sections 3.7.7 and 3.7.1). On the other hand, the dependent variable for each bivariate correlation test was a single variable presented to respondents as a statement in the questionnaire for their rating in 5-point Likert's scale. Each statement described the pertinent dependent variable. Table 4.24 presents the relevant hypotheses with their corresponding value maximization theory of ERM implementation, and their pertinent statements described in the questionnaire. Sections 4.11.1 to 4.11.7 present the results of these empirical tests.

Table 4.24: The Hypotheses, the Theory, and the Questionnaire Statements

H_i	Value Maximization Theory	Variable Code	Questionnaire Statement
H_3	Cost of financial distress	b12	ERM reduces expected costs of financial distress
H_4	Lowering tax burden	b21	ERM reduces company's expected taxes
H_5	Cost for external financing	b22	ERM reduces the cost for external financing
H_6	Firm's credit rating	b17	ERM has a positive impact on enterprise's credit rating
H_7	Equity market reward	b20	Implementing ERM program will be rewarded by the equity market
H_8	Informational asymmetries	b15	ERM reduces information gap between managers and investors
H_9	Agency problem	b14	ERM reduces volatility of managers' bonuses and salaries

Before the bivariate correlation hypotheses tests were performed, the test for scale reliability was conducted on the *ERM Implementation* construct. The ERM *Implementation*'s summated scale was constructed using 14 statements in the questionnaire as described earlier. Table 4.25 presents the result of the reliability analysis with the Cronbach's alpha score of 0.855.

Table 4.25: Result of Scale Reliability Test On ERM Implementation

Scale	No. of Item	Cronbach's Alpha
ERM Implementation	14	.855

The coefficient alpha of above 0.6 indicates satisfactory internal consistency reliability of the summated scale of the 14 items for construct ERM Implementation (Malhotra, 2004). With this result, we could confidently run the tests on the formulated hypotheses in relation to the construct.

In the bivariate correlation analysis, hypotheses H_3, H_4, H_5, H_6, H_7, H_8, and H_9 were tested using the product moment correlation statistic as has been described in section 3.14. The product moment correlation statistic, also known as Pearson correlation coefficient, summarizes the strength of association between two metric variables. The coefficient is usually denoted as *r*. The *r* values above 0.5 are considered to be indicating strong association between an independent and dependent variables (Malhotra, 2004). Further more, the linear relationship between a particular two independent and dependent variables is statistically tested for its significance using *t* statistic. The test for significance is performed by examining the following hypotheses:

$$H_0: \beta_1 = 0$$

$$H_1: \beta_1 \neq 0$$

with the null hypothesis, H_0, implies that there is no linear relationship between the independent and dependent variables. The alternative hypothesis, H_1, implies that there is a linear relationship between independent and dependent variables ($\beta_1 \neq 0$) and the association is statistically significant (Malhotra, 2004).

4.11.2 Examining H_3

In the test of hypothesis H_3, which reads, *ERM implementation has an effect on reducing cost of financial distress*, the results indicate that *ERM Implementation* has a positive and significant association with the reduction in cost of financial distress. The Pearson correlation coefficient, *r*, is 0.548. The *t* statistic two-tailed test is significant at all level with p = 0.000.

Hence, the null hypothesis of no relationship between ERM implementation and reduction in cost of financial distress is rejected. By the same interpretation, H_3 is accepted. The Pearson coefficient, *r*, of 0.548 indicates a rather strong association between ERM implementation and the reduction in cost of financial distress for the firms. The positive value of the Pearson coefficient also indicates that the effect of the correlationship exists in tandem with the ERM value maximization theory.

4.11.3 Examining H_4

The bivariate correlation test on H_4 which reads, *ERM implementation has an effect on lowering tax burden*, indicates a very weak linear association between ERM implementation and lowering tax burden for the firms with $r = 0.044$. Besides, the 2-tailed p-value of 0.815 also indicates the association between the independent and dependent variables is insignificant at $\alpha = 0.10$ level. Hence, the null hypothesis of no relationship between ERM implementation and lowering tax burden reduction is accepted (H_0: $\beta_1 = 0$). By the same interpretation, H_3 is rejected.

4.11.4 Examining H_5

In the test of hypothesis H_5, which reads, *ERM implementation has an effect on reducing cost for external financing*, the results indicate that the independent variable *ERM Implementation* has a positive and significant association with the reduction in *cost for external financing*, which is the independent variable. The Pearson correlation coefficient, *r*, is 0.692. The *t* statistic two-tailed test is significant at all levels with p = 0.000. Hence, the null hypothesis of no relationship between ERM implementation and reduction in cost for external financing is rejected (H_0: $\beta_1 = 0$). By the same interpretation, H_5 is accepted. The Pearson coefficient, *r*, of 0.692 indicates a rather strong association between ERM implementation and its effect on reducing the cost for external financing for the firms. The positive value of the Pearson coefficient also indicates that the effect of the correlationship between the independent and dependent variables happens in tandem with the proposition by the ERM value maximization theory.

4.11.5 Examining H_6

In the test of hypothesis H_6, which reads, *ERM implementation has an effect on improving firm's credit rating*, the results indicate that *ERM Implementation* has a positive and significant association with the credit rating improvement of the firms. The *t* statistic two-tailed test is significant at all level with p = 0.000. The Pearson correlation coefficient, *r*, is 0.304. Hence, the null hypothesis of no relationship between ERM implementation and reduction in cost of financial distress is rejected. By the same interpretation, H_6 is accepted. However, the Pearson coefficient, *r*, of 0.304 indicates a rather weak association between ERM implementation and its effect on improving the firms' credit rating in the financial markets. Nevertheless, the positive value of the Pearson coefficient indicates that the effect of the correlationship between the independent and dependent variables happens in line with the proposition by the ERM value maximization theory.

4.11.6 Examining H_7

In the test of hypothesis H_7, which reads, *ERM implementation will be rewarded by the equity market*, the results indicate that *ERM Implementation* has a positive and significant association with the firms being rewarded by the equity market. The *t* statistic two-tailed test is significant at all level with $p = 0.000$. The Pearson correlation coefficient, r, is 0.338. Hence, the null hypothesis of no relationship between ERM implementation and its impact in causing the firms being rewarded by the equity market is rejected. By the same interpretation, H_7 is accepted. However, the Pearson coefficient, r, of 0.338 indicates a weak association between the independent variable, ERM implementation, and its effect on reducing informational asymmetries in the firm, which is the dependent variable. Albeit so, the positive value of the Pearson coefficient indicates that the effect of the correlationship between the independent and dependent variables happens in tandem with the proposition by the ERM value maximization theory.

4.11.7 Examining H_8

In the test of hypothesis H_8, which reads, *ERM implementation will reduce informational asymmetries in the firm,* the results indicate that *ERM Implementation* has a positive and significant association with its effect in avoiding or reducing informational asymmetries in the firms. Informational asymmetries are defined as the disparity, gap of information or miscommunication that exist among the firms' stakeholders in regard to, among others, company's risk profile, investment preference, financing choice and the likes, that are affecting the firms. The *t* statistic two-tailed test is significant at all level with $p = 0.000$. The Pearson correlation coefficient, *r*, is 0.315. Hence, the null hypothesis of no relationship between ERM implementation and its impact in reducing informational asymmetries in the firms is rejected. By the same interpretation, H_8 is accepted. However, the Pearson coefficient (*r*) of 0.315 indicates that the effect of ERM implementation in reducing informational asymmetries in the firms is not strong. Nevertheless, the positive value of the Pearson coefficient indicates that the effect of the correlationship between the independent and dependent variables exists in line with the proposition by the ERM value maximization theory.

4.11.8 Examining H_9

The test of hypothesis H_9, which reads, *ERM implementation will reduce volatility of managers' bonuses and salaries,* involves examination of the *agency problem* theory. The agency problem theory postulates that managers are motivated to manage firms' risk because they have personal interests in the firms. One of the main interests involved is to stabilize their remuneration provided by the firms, which are their employers. Hence hypothesis H_9 is developed. The results indicate that *ERM Implementation* has a positive and significant association with it impact to stabilize managers' remuneration. The *t* statistic two-tailed test is significant at all level with $p = 0.000$. The Pearson correlation coefficient, *r*, is 0.401. Hence, the null hypothesis of no relationship between ERM implementation and its effect to reduce volatility of managers' bonuses and salaries is rejected. By the same interpretation, H_9 is accepted. Nevertheless, the Pearson coefficient, *r*, of 0.401 indicates that the strength of the association is at best marginal. On the other hand, the positive value of the Pearson coefficient indicates that the effect of the correlationship between the independent and dependent variables happens in tandem with the proposition by the ERM value maximization theory.

4.11.9 ERM Value Maximization Hypotheses in Summary

There are together seven hypotheses being tested for the value maximization theory of ERM implementation. Out of the seven hypotheses testing, all excepts one show positive and significant associations between the independent and dependent variables. Table 4.26 presents these findings.

Table 4.26: Results of Hypotheses Testing on H_3 to H_9

Hypothesis	Independent Variable	Dependent Variable	Pearson Coefficient (r)	p-value (2-tailed)
H_3	ERM Implementation	Reducing cost of financial distress	.548	.000***
H_4	ERM Implementation	Lowering tax burden	.044	.815
H_5	ERM Implementation	Reducing cost for external financing	.692	.000***
H_6	ERM Implementation	Improving firm's credit rating	.304	.000***
H_7	ERM Implementation	Rewarded by equity market	.338	.000***
H_8	ERM Implementation	Reducing informational asymmetries	.315	.000***
H_9	ERM Implementation	Reducing agency problem	.401	.000***

****significant at α=0.01 level*

From the six significant associations, the strengths of two associations are considered to be strong with the Pearson coefficient *(r)* values above 0.5 (H_3 and H_5). The strength of associations of the other four can be described as, at best, marginal. The *r* values of these four associations range from 0.304 to 0.401(H_4, H_6, H_7, H_8, and H_9).

4.12 EXAMINING THE ERM VALUE CREATION TRANSMISSION HYPOTHESES

4.12.1 Introductory

Apart from the value maximization theory propositions of ERM implementation as mentioned in section 4.11.1 earlier, the literature review in chapter 2 also presented a strategic conceptualization of risk premium which is being referred to as the **CLS model** in this thesis (see sections 2.12). In our ERM conceptual framework as depicted by Figure 4.12 (reproduced from Figure 3.2), this CLS model acts as a value creation transmission mechanism through which the strategic conceptualization of risk premium exerts its efficacy and impact to enhance value creation to shareholders by way of reducing firms' cost of capital.

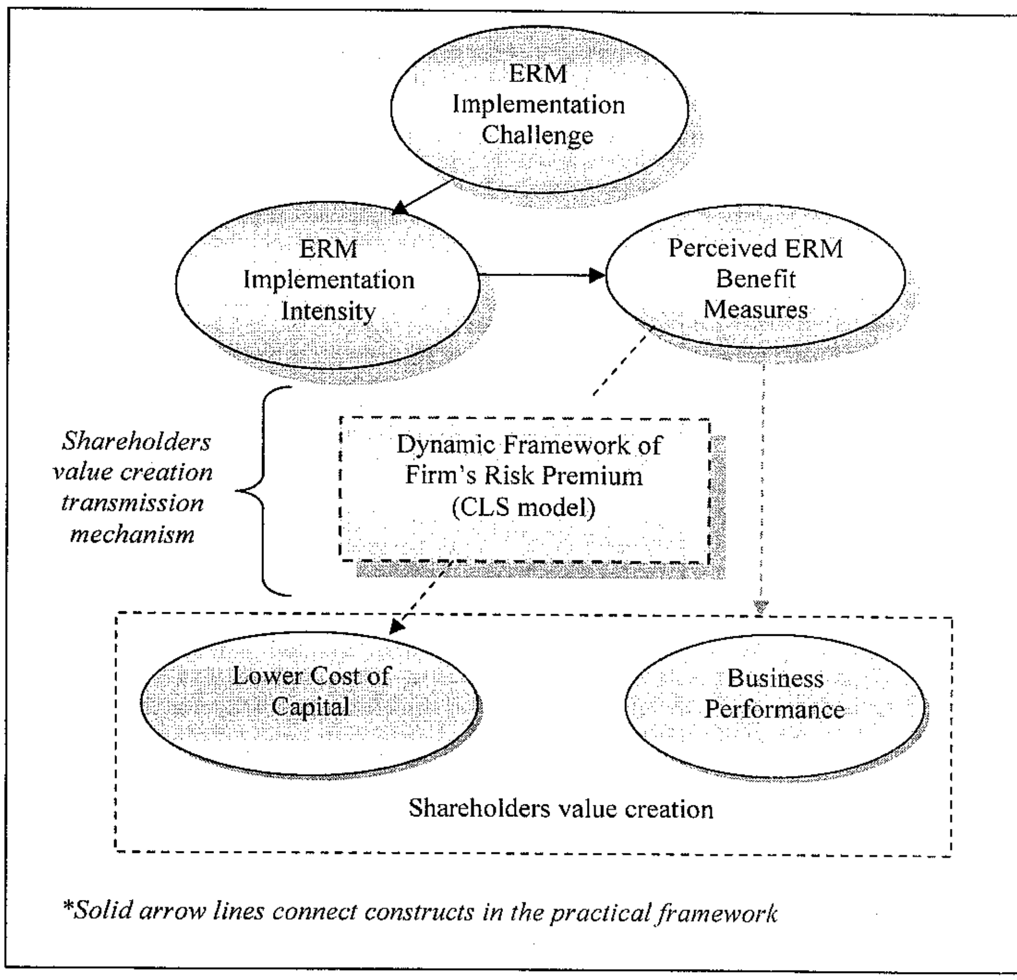


Figure 4.12: Value Creation Transmission Mechanism Diagram

The CLS model classifies firms' unsystematic risks into three classes namely, tactical, strategic and normative risks. The CLS further postulates that by managing these three classes of unsystematic risks well, the risk premium of the firms expected by the debtholders will be reduced, thus reducing the cost of capital for the firms. This in turn, is a form of value creation to the shareholders since the shareholders can now share less of the company's earnings with the debtholders in interest (for loan financing) or coupon (for bond financing) payments. Figure 4.13 depicts these relationships.

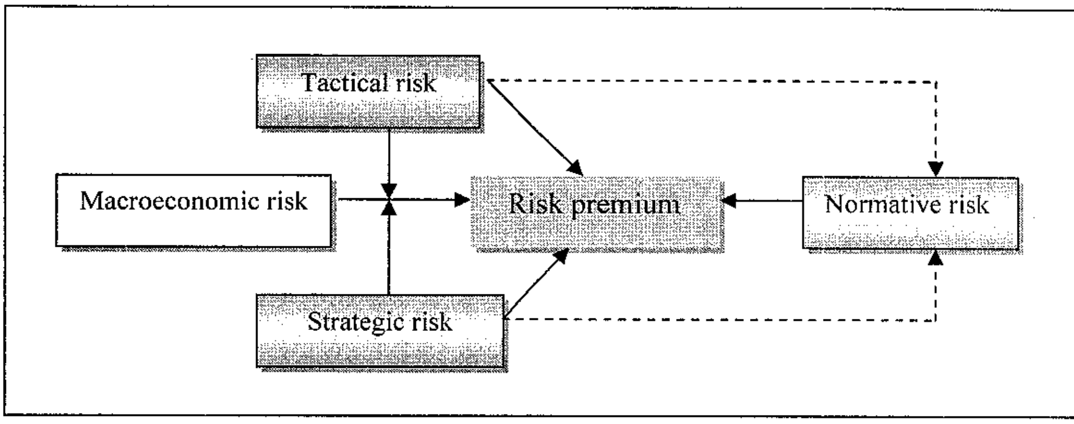


Figure 4.13: CLS risk premium model

To test the above argument postulated by the CLS risk premium model, this study develops hypotheses H_{10}, H_{11}, and H_{12} in an attempt to empirically examine the association between ERM implementation with its impact in reducing / improving the firms' three classes of unsystematic risk with data represented through the public listed companies on the Bursa Malaysia. The testing of hypotheses H_{10}, H_{11}, and H_{12} involved bivariate correlation test between *ERM Implementation*, which is the independent variable, with the three classes of unsystematic risk, i.e. tactical, strategic, and normative, which separately become the dependent variables. The construct *ERM Implementation* is the same as that of in the value maximization hypotheses testing as described in sections 4.11.2 to 4.11.8 which is represented by 14 variables (statements) contained in the questionnaire.

On the other hand, dependent variables *tactical risk*, *strategic risk*, and *normative risk* are measured by seven, nine, and four items respectively. Each item describes the pertinent nature or situation in regard to the corresponding unsystematic risk. Each item was presented to respondents as a statement in the questionnaire for their rating in 5-point Likert's scale. Table 4.27a, 4.27b, and 4.27c present the corresponding items (questionnaire statements) measuring each of the three classes of unsystematic risk (dependent variables) of the CLS model. Table 4.27d presents the attached note that was incorporated in the questionnaires which provides additional explanation on the meaning of several highlighted terms for the benefit of the respondents' understanding

Table 4.27a: Tactical Risk and Its Measurement Items

No	Items	Statements
1	d2	There is minimum information friction (gap) between the management and the shareholders
2	d3	There is minimum gap of risk preference between the management and shareholders of firm's investment undertaking
3	d4	There is satisfactory liquidity/free float of firm's shares traded in the stock exchange
4	d5	Company uses hedging strategy heavily
5	d6	Hedging strategy employed by firm is effectively meeting its intended objectives
6	d7	The use of ***real options*** (*see* **Note**[1]) to reduce firm's earning surprises is effective and satisfactory

Table 4.27b: Strategic Risk and Its Measurement Items

No	Items	Statements
1	d8	Management is effective in isolating firm's earnings from market forces/uncertainty
2	d9	Management is effective in shaping the firm to attain and sustain its ***structural advantages*** (*see* **Note**[2])
3	d10	Management is effective in isolating its earnings from rivals attacks through attaining structural advantages
4	d11	Our enterprise has attained ***resource-based advantages*** (*see* **Note**[3])
5	d12	Our enterprise's resource-based advantages has helped isolate it from market pressures
6	d13	Our enterprise has attained ***knowledge-based advantage*** *(i.e. attain superior information from competitors regarding market situation and resources to protect earnings fluctuation)*
7	d14	Our firm is able to absorb, interpret, and commercialize critical information on a timely basis which has helped to isolate its earnings from rival attack, market pressure, and technological obsolescence
8	d15	Our firm has attained ***strategic options advantages*** *(i.e. ability to diversify business line, expand market reach and product offering, acquire key supplier)*
9	d16	Our firm possesses a portfolio of ***strategic options*** *(i.e. ability to diversify business line, expand market reach and product offering, acquire key supplier)* which has enabled it to mitigate macroeconomic and industry disturbances risk.

Table 4.27c: Normative Risk and Its Measurement Items

No	Items	Statements
1	d17	Our enterprise is successful in complying with industry and regulatory rules
2	d18	Our firm will face higher risk premium if we fail to comply with industry or institutional norms *(i.e. those market rules expected by investors, regulators, interest groups)*
3	d19	Our firm's competitive advantages achieved through implementing ***strategic risk management*** *(i.e. structure, resource, knowledge advantages)* will be quickly matched by our competitors.
4	d20	Our firm's competitive advantages achieved through implementing ***tactical risk management*** *(i.e. hedging and options)* will be quickly matched by our competitors.

Table 4.27d: Attached Note in Questionnaire for Additional Explanation on Terms

Note: [1] **Real option** Real options are contingent commitments made by a firm that grant it the right to secure non-commodity resources at a later date. [2] **Structural advantage** Firm's market positioning in the industry resulting in advantages against its competitors in areas such as supplier power, threat of substitutes, degree of rivalry, buyer power, and barriers to entry. [3] **Resource-based advantage** Firm's strategy and competitive advantage in reducing demand- and supply-side risk. Demand side risk - a firm strategize customer loyalty program such as offering better quality good and services at lower cost than its rivals to ride through cyclical downturns. Supply-side risk - a firm forges strategic alliances with its suppliers and manage its factors of production and supply chain more effectively.

The data that was used to test the efficacy of the CLS model was collected during the second batch survey exercise. In the second batch survey exercise, there were 31 cases of answered and accepted questionnaires which provided the information on the respondent firms' ERM implementation and their tactical, strategic, and normative risks situations. Table 4.28 presents the formulated hypothesis statements, i.e. H_{10}, H_{11}, and H_{12}. Also indicated in Table 4.28 are the respective unsystematic risks classified by the CLS risk premium model which serve as the dependent variables in the bivariate correlation tests. The measurement items for each class of unsystematic risk are also shown.

Table 4.28: Hypotheses of the Shareholders Value Creation Transmission Mechanism with ERM Implementation

H_i	Classes Unsystematic Risk	Items' Code	Hypothesis Statements
H_{10}	Tactical Risk	d2, d3, d4, d5, d6, d7	*ERM implementation will reduce firm's tactical risk*
H_{11}	Strategic Risk	d8, d9, d10, d11, d12, d13, d14, d15, d16	*ERM implementation will reduce firm's strategic risk*
H_{12}	Normative Risk	d17, d18, d19, d20	*ERM implementation will reduce firm's normative risk*

The aims of the bivariate correlation tests on H_{10}, H_{11}, and H_{12} are to ascertain the efficacy of the shareholders value creation transmission mechanism which is underpinned by the conceptualization of the risk premium model (CLS model). This is performed by way of examining the associations between ERM implementation (independent variable) and its impact on reducing the three classes of unsystematic risks, i.e. tactical, strategic, and normative risks (dependent variables). Sections 4.12.3 to 4.12.5 present the results of these empirical tests.

4.12.2 Cronbach's Alpha Reliability Tests On Constructs

As with the situation in section 4.11.1, before the bivariate correlation hypothesis tests could proceed, the test for scale reliability was conducted on the constructs *ERM Implementation*, *Tactical Risk*, *Strategic Risk*, and *Normative Risk.* Table 4.29 presents the result of the reliability analysis with the respective Cronbach's alpha scores for each of the constructs' summated scales.

Table 4.29: Result of Scale Reliability Test on ERM Implementation and the CLS model

Scale	No. of Item	Cronbach's Alpha
ERM Implementation	14	.904
Tactical Risk	7	.868
Strategic Risk	9	.921
Normative Risk	4	.781

As shown in Table 4.29, the Cronbach's alpha coefficients are all above the recommended value of 0.6. These results indicate that the summated scales of all the four constructs possess satisfactory internal consistency reliability (Malhotra, 2004). With these results in sight, the study could confidently proceed with the running of the bivariate correlation tests on the formulated hypotheses in relation to the constructs.

4.12.3 Test Statistic for Association Significance

Similar to the bivariate correlation analysis for the ERM value maximization hypotheses as discussed in section 4.11.1, hypotheses H_{10}, H_{11}, and H_{12} were tested using the product moment correlation statistic as has been described in section 3.14. To recapitulate, the product moment correlation statistic, also known as Pearson correlation coefficient, is an index that is being used to ascertain whether a linear relationship exists between an independent and a dependent variables (Malhotra, 2004). The index is commonly denoted as r. A rule of thumb would suggest that r values above 0.5 to indicate considerable association between an independent and dependent variables. A r value of 1.0 indicates perfect correlationship between the independent and dependent variables (Malhotra, 2004).

Apart from the product moment correlation statistic to examine association, the linear relationship between an independent and a dependent variable is also statistically tested for its significance using t statistic. The test for significance is performed by examining the following hypotheses:

$$H_0: \beta_1 = 0$$

$$H_1: \beta_1 \neq 0$$

with the null hypothesis, H_0, implies that there is no linear relationship between the independent and dependent variables. The alternative hypothesis, H_1, implies that there is a linear association between independent and dependent variables ($\beta_1 \neq 0$) and the association is statistically significant (Malhotra, 2004).

4.12.4 Examining H_{10}

In the test of hypothesis H_{10}, which reads, *ERM implementation will reduce firm's tactical risk,* the results indicate that ERM Implementation has a positive and significant association with its effect to reduce firms' tactical risk. The CLS risk premium model defines the nature of tactical risk as that associated with the uncertainty in firms' expected earnings. CLS risk premium model posits that investors are averse to earnings surprises owing to information asymmetries in the market between managers and investors. Thus, investors will request lower risk premium from firms who can stabilize earnings or minimize firms' earnings surprises (Chatterjee et al., 1999) (see section 2.12.2 for detailed explanation).

The *t* statistic two-tailed test is significant at $\alpha = 0.05$ level with p-value = 0.037. The Pearson correlation coefficient, *r*, is 0.376. Hence, the null hypothesis of no relationship between ERM implementation and its impact in reducing firms' tactical risk is rejected. By the same interpretation, H_{10} is accepted. Despite so, the Pearson coefficient (*r*) of 0.376 indicates that the ERM implementation impact in shareholders value creation through reducing firms' tactical is not very strong. Nevertheless, the positive value of the Pearson coefficient proves the existence of a linear association between the independent and dependent variables. It also statistically ascertains the efficacy of the value creation transmission mechanism of the CLS risk premium model via the tactical risk dimension.

4.12.5 Examining H_{11}

The test results of hypothesis H_{11}, which reads, *ERM implementation will reduce firm's strategic risk*, indicate that ERM Implementation has a positive and significant association with its effect to reduce firms' strategic risk. The CLS risk premium model defines the nature of strategic risk as "the probability that a firm can isolate its earnings from macroeconomic and industry-specific disturbances" (Chatterjee et al., 1999:560). The source of strategic risk originated from the imperfections in resource and output markets which cause uncertain performance outcomes from the firm's committed resources. As such, firms undertake to manage strategic risk in formulating strategy to commit and deploy their scarce yet precious resources. This will ensure firms continue to attain and sustain competitive advantage in the marketplace (Chatterjee et al., 1999). Section 2.12.3 provides detailed description on CLS model's strategic risk.

The t statistic two-tailed test is significant at $\alpha = 0.10$ level with p-value = 0.055. The Pearson correlation coefficient, r, is 0.348. Hence, the null hypothesis of no relationship between ERM implementation and its impact in reducing firms' strategic risk is rejected. By the same interpretation, H_{11} is accepted. Nonetheless, similar to that of in H_{10}, the Pearson coefficient (r) of 0.348 does not indicate a very strong linear correlation between ERM implementation and its impact in reducing firms' strategic risk. Albeit so, the positive value of the Pearson coefficient attests the existence of the shareholders value creation transmission effect through ERM implementation. The results in testing H_{11} statistically substantiate the perceived value creation efficacy of managing firms' strategic risk.

4.12.6 Examining H_{12}

The test of hypothesis H_{12}, which reads, *ERM implementation will reduce firm's normative risk,* yields an insignificant linear association between ERM Implementation and its effect in reducing firms' normative risk. The CLS risk premium model defines the nature of normative risk as the risk premium (or penalty) that a firm is subjected to if it fails to comply with its institutional norms or rules that it is expected to follow (Graf, 2004; Chatterjee et al., 1999). These norms represent the common expectations of the firm's stakeholders, i.e. investors, regulators, interest groups, with regards to its behavior (Graf, 2004). The CLS model posits that any risk premium advantages attained through active management of tactical and strategic risks will be soon neutralized owing to competitive forces. These competitive forces will prompt competitors to quickly imitate the advantages attained by the firms (Chatterjee et al., 1999; Scott, 1995; Hamel & Prahalad, 1994) (see section 2.12.4 for detailed explanation).

The t statistic two-tailed test is insignificant at $\alpha = 0.10$ level with p-value = 0.191. The Pearson correlation coefficient, r, is 0.241. Hence, the null hypothesis of no linear relationship between ERM implementation and its impact in reducing firms' normative risk is accepted, i.e. H_0: $\beta_1 = 0$. By the same interpretation, H_{12} is rejected. The results imply that there is no adequate evidence to indicate the importance of managing firms' normative risk as defined by the CLS risk premium model in creating value to shareholders by way of is impact in reducing firms risk premium. Thus, no value creation is being transmitted in managing this dimension of firms' unsystematic risk.

4.12.7 ERM Value Creation Transmission Hypotheses in Summary

The hypotheses tests for ERM value creation transmission mechanism through the conceptualization of the strategic risk premium of the firms yielded mixed results. Table 4.30 summarizes the hypotheses testing results.

Table 4.30: Results of Hypotheses Testing on H_{10} to H_{12}

H_i	Independent Variable	Dependent Variable	Pearson Coefficient (r)	p-value (2-tailed)	H_i Accepted / Rejected
H_{10}	ERM Implementation	Reducing firm's tactical risk	0.376	0.037**	H_{10} Accepted
H_{11}	ERM Implementation	Reducing firm's strategic risk	0.348	0.055*	H_{11} Accepted
H_{12}	ERM Implementation	Reducing firm's normative risk	0.241	0.191	H_{12} Rejected

*Significant at $\alpha = 0.10$ level
**Significant at $\alpha = 0.05$ level

As can be seen in Table 4.30, the tests for H_{10} and H_{11} yielded results in the hypothesized direction. In other words, the results are in support for the proposition made by the CLS risk premium model. On the contrary, the test of H_{12} revealed a result that pointed to the opposite direction of the hypothesis. Thus, hypotheses H_{10} and H_{11} are accepted whilst H_{12} is rejected. In addition to this, it is worth pointed out that although the test results for H_{10} and H_{11} are statistically significant, the strength of associations between the independent and dependent variables are not very strong. This phenomenon is revealed by the Pearson coefficients (r) which are below the value of 0.5. We discuss the plausible reasons for these observations in chapter 5.

CHAPTER 5 DISCUSSION AND CONCLUSION

5.1 INTRODUCTORY

Research in ERM is still relatively new, especially at the empirical level. This is more so in Malaysia. As such, the effort described in this thesis should make a valuable contribution to the ERM research especially in the Malaysia's setting. The SEM measurement model for *ERM implementation intensity* and *perceived ERM benefit measures* developed in this thesis should also provide enrichment to the development of ERM research. This research contributes to the literature of enterprise (corporate) risk management by presenting empirical results and findings of an ERM implementation model which encompasses the causal relationships among pertinent constructs with their respective factors and corresponding variables. The proposed and modified models (of the SEM models) featured in this thesis are an encouraging output of this research. These models should provide a reference and spur additional interest to further improve understanding as well as to further refine research into ERM practices by the firms.

This study has not only successfully integrated risk management theory with traditional financial theory as asserted by Mehr and Forbes (1973) (see section 2.2.2) in proposing the ERM implementation model, but it has also managed to incorporate strategy theory with the former two theories in theorizing the value creating transmission mechanism in making sense of instituting an ERM framework within the firm's organizational structure. For instance, the merging of traditional financial theory and strategy theory with the risk management theory has provided holistic and enterprise-wide perspectives of managing risk and developing a risk management model for the firm through ERM. The advocacy for ERM has involved the rebuttal of the neo-classical finance theory's capital asset pricing model (CAPM) which holds antithetical views of the value in managing firm-specific risks as compared to those of the classical financial theory as well as the strategy theory. The strategic view of managing firm-specific risk expounds the strategic conceptualization of risk premium model for the firm which espouses the management of the firm's tactical, strategic, and normative risks.

It is worth highlighting that the analytic model using the stringent SEM test in this study is a powerful statistical technique to validate the posited concept or theory, i.e. the causal relationships among constructs and factors theorized by this thesis. Furthermore, the analysis results of the two SEM models (the proposed and modified models) developed in this thesis are consistent with the many literatures being reviewed in Chapter 2. The two models represent an ERM **practical framework** in the Malaysia setting, which have demonstrated consistency with the **conceptual framework** expounded by those literatures[44]. The contribution of the ERM practical framework is significant in that it achieves consistency with the conceptual framework even in the midst of the potential effect of a cross-cultural difference inherent in the Malaysian public listed companies (PLCs) with those of being referred to in the reviewed literatures.

[44] Consistency in the significance of the structural paths at the very least, although indicators in the measurement model may have showed some variations as a result of the dynamism of data reduction in the factor analysis.

5.2 FINDINGS RELATED TO THE CONCEPTUAL AND PRACTICAL FRAMEWORK

The principal aim of this study is to examine how an effective implementation process of enterprise risk management (ERM), i.e. *implementation intensity*, will bring about value-enhancing outcome, i.e. *perceived ERM benefit measures*, to Malaysian corporations (the PLCs). In addition, this study also examines whether the challenges of ERM implementation process will negatively affect such implementation intensity, hence, creating a perceptual causal relationship model relating these variables. The factor analysis yielded a factor model which enriched these causal relationships in the proposed model (the practical framework). Hypotheses of these causal relationships among variables were tested on the proposed model. Findings revealed that all hypothesized causal relationships are statistically significant. The modified model which incorporated a second-order factor model further enhanced the perspective and generalizability of the overall causal relationships of the factors in the model. The modified model did not alter the underlying measurement model of the proposed model.

The proposed and modified models serve as useful instruments in that they help identify areas in the ERM implementation process where relevant initiatives to enhance ERM intensity may gain further value-enhancing benefits for the enterprise. In other words, the two SEM models can be adopted as predictive models by researchers and practitioners to simulate a successful ERM implementation program for enterprises. With the insights provided by these models, an enterprise can plan, strategize, implement and monitor its ERM initiatives and increase the chances of achieving a successful ERM program.

For instance, an enterprise that attempts to boost its ERM implementation intensity may turn to the two SEM models for insights. The models suggest that the firm to look into two dimensions or factors of ERM implementation, namely (1) *performance and target setting*, and (2) *business function and process integration* (see Table 4.13). Further more, the models also reveal that in order to cope with the *performance and target setting* dimension, for example, an enterprise should put in place initiatives such as (i) providing common understanding of the objectives of each ERM initiative, (ii) aligning ERM strategy with corporate strategy, (iii) identifying key risk indicators, (iv) integrating risk with key performance indicators, (v) aligning ERM initiatives to business objectives, and (vi) providing the rigor to identify and select risk responses (i.e. risk avoidance, risk reduction, risk sharing, and risk acceptance). All of these initiatives are indicators for the *performance and target setting* factor of the ERM implementation intensity (see Table 4.12). In the same light, the models also disclose that an enterprise ought to cover the dimension of *business function and process integration* by putting in place initiatives such as (i) integrating risk across all functions and business units, (ii) providing common terminology and set of standards of risk management, (iii) providing enterprise-wide information about risk, (iv) integrating risk with corporate strategic planning, (v) reducing risk of non-compliance, (vi) quantifying risk to the greatest extent possible, and (vii) enabling everyone to understand his/her accountability (see Table 4.12).

Enterprises can examine on the areas suggested by the models to enhance their ERM implementation whilst being wary of the potential challenges that may impede their implementation intensity. Enterprises can take heed from the models of these negative effects and strive to manage them well so that maximum benefits can be obtained from the enterprises' ERM program. It is worth mentioning here that the negative elements of implementation challenges pointed out by the models, i.e. (i) there is strong competition from other type of management techniques to be implemented, (ii) there is wide discrepancy between expectation and practices in ERM implementation, ad (iii) there is inadequate technology support (see Table 4.12) are of internal constraints to the organization. Nonetheless, enterprises should also be aware that extraneous variables such as political stability, economic growth, technology, shareholders expectation, government policies and regulations can also be factors potentially impeding their ERM implementation intensity. Analyses of these extraneous factors however, are beyond the scope of this study.

5.3 DISCUSSION ON THE FACTOR MODEL OF THE ENDOGENOUS CONSTRUCTS OF THE SEM MODEL

5.3.1 The Theorized ERM Practical Framework

To recapitulate the discussion in section 4.3 to 4.6 in relation to the findings of the exploratory and confirmatory factor analyses, the proposed (modified) SEM model embodies a factor model as depicted by Figure 5.1. For instance, the second-order endogenous construct *ERM Implementation Intensity* contains two first-order factors, namely **performance and target setting** (construct I1), and **risk integration to business function and process** (construct I2). On the other hand, the second-order endogenous construct *Perceived ERM Benefit Measures* yields three first-order factors, namely **risk taking capability and confidence building** (construct B1), **effective stakeholders communication** (construct B2), and **enterprise and managerial excellence** (construct B3). Each first-order factor (construct) in turn, is measured by several indicators or variables. *Appendix 8* provides graphical representation of these relationships between the first- and second-order factors as well as their respective indicators. The manifestation of these causal relationships among constructs and indicators which are derived from the exploratory and confirmatory factor analysis as well as the SEM analysis constitutes the theorized ERM *practical framework* of this study.

Against the backdrop of the absence of an universally-accepted definition of ERM, the theorized ERM practical framework (Figure 5.1), in which all of the posited causal relationships among the constructs (in the structural model) and their indicators (in the measurement model) have been validated by the SEM analysis, has provided insights to firms (especially PLCs on Bursa Malaysia) on how to ensure an effective implementation intensity of ERM, i.e. what elements and initiatives to be put in place, as well as what to expect out of a successful ERM program, i.e. what benefits to be obtained. The proposed ERM implementation model (practical framework) highlights that the objective of an effective implementation of ERM program is to provide an integrated, comprehensive assessment of all the risks that an enterprise is exposed to during its course of business operations. The model meticulously points to two dimensions of (constructs I1 and I2) of an effective and satisfactory implementation of an ERM program which characterize various pertinent initiatives (the indicators). Further discussion on these aspects is presented in the ensuing sections.

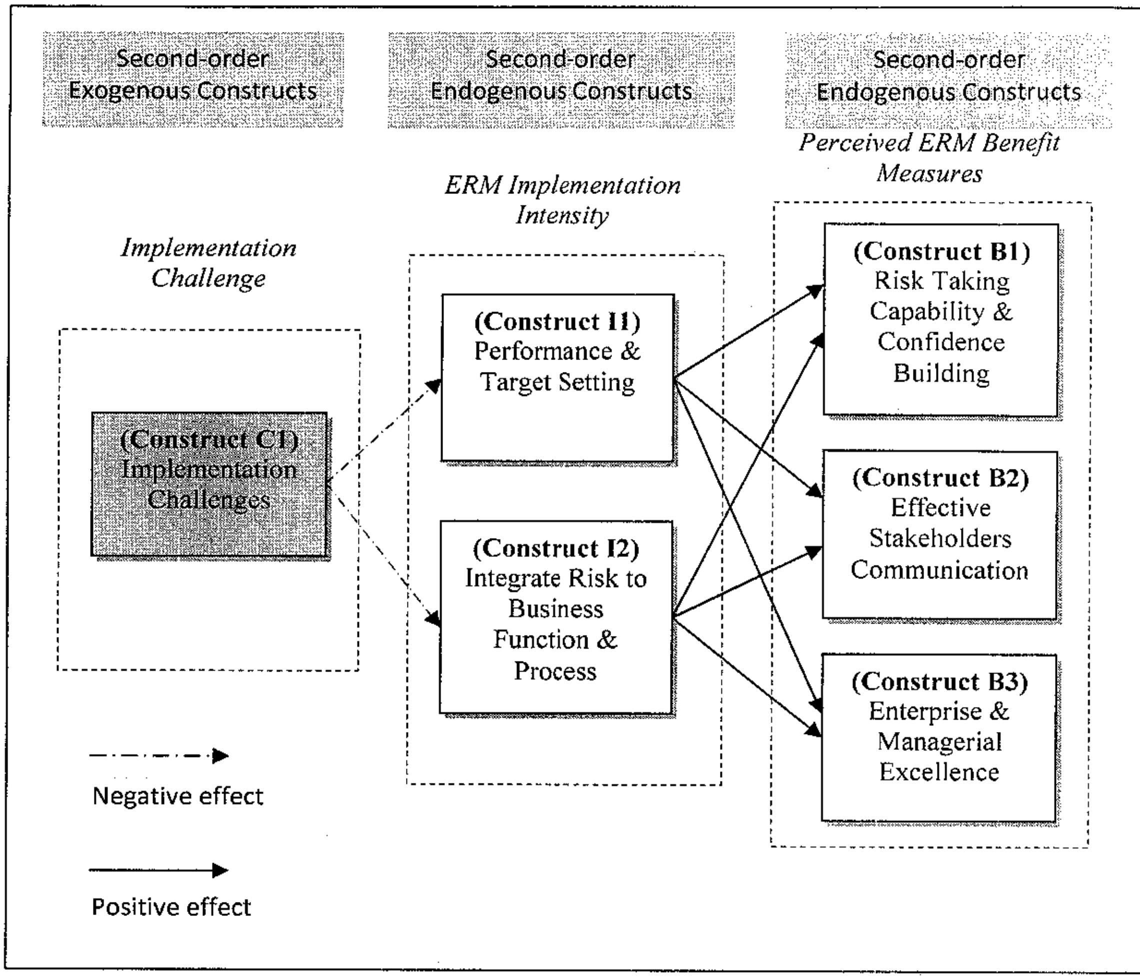


Figure 5.1: Factor Model in the Proposed Model

5.3.2 Endogenous Constructs On ERM Implementation Intensity

5.3.2.1 Performance and Target Setting (Construct I1)

The first dimension of 'effective implementation intensity' in the theorized ERM *practical framework* would entail an enterprise to clearly set its **performance measure and target** for the enterprise's ERM program (construct I1 in Figure 5.1). To this end, the enterprise should ensure that its ERM program has a common language and view of risk across the organization. This also means that the ERM program has to provide common understanding of the objectives of each ERM initiative to be undertaken by the enterprise. This is crucial because together with the industry knowledge that the enterprise has in its possession, the above ERM element forms the foundation for the enterprise to fully understand its risk profile.

For a conglomerate which operates in multiple industries or business lines, the risk faced by its diverse business units can be assessed using common risk profiling and compared to its corporate strategic goals. An effective implementation of ERM program also enables the enterprise to assess in a comprehensive manner its risk exposure which is associated with the introduction of a new product line or the undertaking of a new investment. By ensuring ERM strategy to be aligned with corporate strategy as well as aligning ERM initiatives to business objectives, the proposed ERM framework provides the rigor for the enterprise to identify risk and to subsequently select the appropriate risk response, e.g. risk avoidance, risk reduction, risk sharing, or risk acceptance. This element of ERM capability allows the enterprise to better understand its risk appetite and to gain clearer picture of its overall risk level.

To maintain the objectivity and clarity of ERM implementation intensity, it is imperative to identify key risk indicators (KRIs). Identifying these KRIs would facilitate risk profiling and the comprehension of the correlations and dependencies that might exist across various products, functions and operations. Furthermore, the identified KRIs should be incorporated into the key performance indicators (KPI) of the enterprise.

5.3.2.2 Integrate Risk to Business Function and Process (Construct I2)

The second dimension of 'effective implementation intensity' of the theorized ERM *practical framework* calls for the enterprise to engage in initiatives to **integrate risk to all business functions and processes** (construct I2 in Figure 5.1). The principal objective of this implementation intensity is to create a risk-aware culture throughout the enterprise. For starters, common terminology and standards of risk management must be set. This element of the implementation intensity would facilitate the development of risk policies for the enterprise. Once policies are in place, they should be communicated throughout the organization so that every member of the organization understands his or her role and accountability. The communication task must encompass the provision of enterprise-wide information about risk to the concerned parties in the organization and this effort should be carried out continuously as well as in a timely manner. The availability of enterprise-wide information about risk in this fashion would in turn, help the quantification of risk to the greatest extent possible. All of the above implementation elements are integral parts for risk governance and control. Having all the above elements in place, an enterprise would have attained the capability to minimize risk of non-compliance towards the prescribed procedures and standards.

The successful creation of a risk-aware culture throughout the enterprise would definitely provide a fertile ground for an effective risk control mechanism within the organization. Under this circumstance, risk can be easily integrated across all business units and functions. On the risk governance front, the board of directors should assume the ultimate oversight responsibility of the enterprise's risk management. The board members must discharge their fiduciary duties by becoming more activists in risk management and to be potentially more risk averse as well. This trend will augur well for all boards of directors of the PLCs so that they become sensitive and responsive in ensuring that risk to be integrated within their respective corporate strategic planning.

5.3.3 Endogenous Constructs On Perceived ERM Benefit Measures

5.3.3.1 Risk Taking Capability and Confidence Building (Construct B1)

The theorized ERM *practical framework* relates the successful ERM implementation intensity to three areas of the 'perceived ERM benefit measures'. The first area of benefits points to the enhancement of **risk taking capabilities and confidence building** (Construct B1 in Figure 5.1). This element of managerial capability is crucial especially in the midst of unprecedented turbulence seen in the global marketplace in recent years which has consequently changed the environment in which firms operate. The confluence of many events such as volatility in the financial, properties, energy and other commodities markets has resulted in uncertainty in the global economic outlook. This economic scenario, coupled with the sometimes strained political relations among countries, have borne serious repercussion in the world trade. This phenomenon has underscored the need for heightened yet enhanced risk management capabilities from the firms.

Nonetheless, these political-economic circumstances are the manifestation of a basic principle in finance discipline whereby risk and return are generally correlated. It is an axiom that holds pertinent to both the firms that operate locally as well as to the multinational corporations which operate globally. It is therefore imperative for the firm's leadership to be able to provide strategic direction in relation to business decision-making by making explicit the level of risk that the firm is willing to take. This amounts to building up the firm's capacity and capability to take and manage risk. This dimension of the firm's managerial capability entails the management to become more actively involved in understanding the risk faced by the firms, in assessing and approving organizational risk appetite and tolerance; create smooth governance procedures; provide increased oversight over business decision-making and performance; as well as to meticulously consider relevant risk management issues (Deloitte, 2009). Having these risk management capacity and capability not only enable the firm to help avoid and minimize losses during adverse economic conditions, they also enable the demonstration of superb managerial quality and attribute which form the building blocks for boosting the managers' confidence when dealing with any unfavorable operating situations.

5.3.3.2 Effective Stakeholders Communication (Construct B2)

The second area of the 'perceived benefits measures' theorized by the ERM *practical framework* is the **effective stakeholders communication** (Construct B2 in Figure 5.1). The evidence from the study indicates that implementation of ERM program facilitates PLCs' reporting to regulators, i.e. to the Bursa Malaysia and the Securities Commission. As public listed entities, the PLCs have to comply with many listing rules and regulations imposed by the authorities. Among others, these rules include providing quarterly financial statements and making public announcement of any development of material information about the firm in an unambiguous and timely manner. Any compliance lapses to the rules will not only potentially cost the PLCs monetary loses (e.g. fine or compound), but just as badly is the loss of the firms' reputation in the eyes of the investing public. An effective ERM implementation will avoid this regulatory compliance breaches as initiatives are put in place to capture and provide all the relevant information for reporting purposes as well as to minimize any supervisory oversight for not reporting what are supposed to be reported.

Besides, an effective ERM implementation framework will also ensure good communication between the various stakeholders of the firms. This is because ERM program calls for the setting up of an effective and efficient communication channel. This can minimize the risk of informational asymmetries especially between the managers and the shareholders as well as between the firm and the creditors. Improving communication and maintaining good public relations with shareholders have become an increasingly important job for the firms. It should be realized that shareholders possess the power to express both their approval (satisfaction) and disapproval (dissatisfaction) of the firms' management team through the buying and selling of their shares holdings. This activity in the share market will obviously affect the companies' share prices. A high level of approval will mean that shareholders will acquire more of the companies' shares, thus increasing the demand and pushing up the share prices. Conversely, a low level of approval will result in companies' shares being sold down, hence causing a downward pressure to the companies' share prices.

5.3.3.3 Enterprise and Managerial Excellence (Construct B3)

The third area of the 'perceived benefits measures' attainable from the theorized ERM *practical framework* is the **enterprise and managerial excellence** (Construct B3 in Figure 5.1). The proposed framework indicates that an effective implementation of ERM will enhance managers' ability to think entrepreneurially and innovatively. These managerial qualities are cultivated through the internalization of risk-aware culture, which characterizes the infusion of risk management into performance objectives and business decisions. The effective implementation of ERM program enables managers to gain a more comprehensive view of the risks facing their organizations. In addition, it also enables managers to comprehend the intertwining of the various sources of risk in their organizations. This understanding of risks augurs well for the enterprises to meet their strategic goals. Achieving the latter, in turn, in which the PLCs can build their core competency through risk management, will put the PLCs in a good position to compete in the marketplace as well as to boost their resilience and profitability.

5.4 DISCUSSION ON THE DYNAMIC FRAMEWORK OF FIRM'S RISK PREMIUM

Figure 5.2 depicts the theorized *conceptual framework* of the shareholders value creating ERM model as has been discussed in sections 3.1 to 3.3. Referring to Figure 5.2, the proposed ERM *practical framework* sits at the upper portion of the overall theorized value creation ERM conceptual framework. At the middle portion of the framework sees the ERM *value creation transmission mechanism*. At the core of this ERM value creation transmission mechanism set a dynamic framework of firm's risk premium embodying the **strategic conceptualization of risk premium** referred to in this thesis as the **CLS risk premium model** (CLS model). At the lower portion of the framework spots the manifestation of shareholders value creation in areas characterized by two constructs, i.e. *lower cost of capital* and *business performance*.

The tests to validate the shareholders value creation characterized by the construct *lower cost of capital* was performed with the bivariate correlation hypotheses analysis of the CLS risk premium model in relation to the management of the firm's tactical, strategic, and normative risks. On the other hand, the validation of the shareholders value creation characterized by the construct *business performance* was undertaken with the bivariate correlation hypotheses tests on the various ERM value maximization theory which highlights those hypotheses as reducing cost of financial distress, lowering cost for external financing, reducing tax burden, improving firm's credit rating, reward by equity market, reducing informational asymmetries, and reducing agency problem.

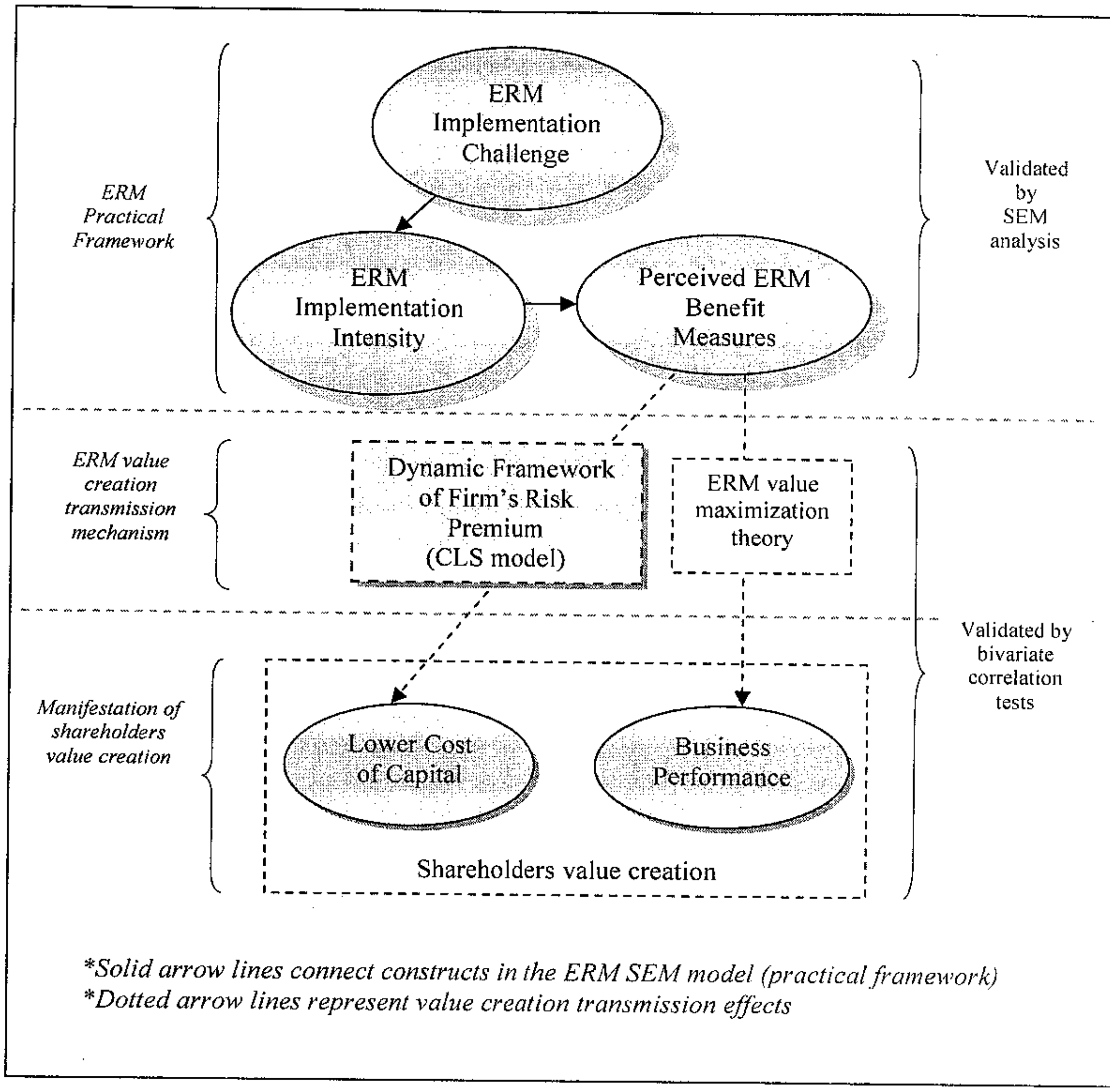


Figure 5.2: Conceptual framework of shareholders value creating ERM model

Figure 5.3 depicts the CLS risk premium model (CLS model) as has been discussed in section 2.12. To recapitulate, the CLS model was developed by Chatterjee, Lubatkin, and Schulze (1999). The CLS model postulated three classes of firm-specific (unsystematic) risk, namely tactical, strategic, and normative risk are relevant to firms and their shareholders, thus should become the targets for enterprise risk management. The CLS model pointed out that tactical risk exists mainly in information asymmetries, whilst strategic risk comes from imperfections in the resource and output markets, and finally normative risk presents itself in the forces that define institutional norms. The CLS model further advocated that the effective management of these three classes of risk would lead to the reduction of the firm's risk premium (see detailed discussion in section 2.12). Note that apart from the three classes of firm-specific (unsystematic) risk, the CLS model also relates the conventional macroeconomic (systematic) risk to the firm's risk premium (see Figure 5.3). Nevertheless, the emphasis of this study is on examining the three classes of firm-specific risk.

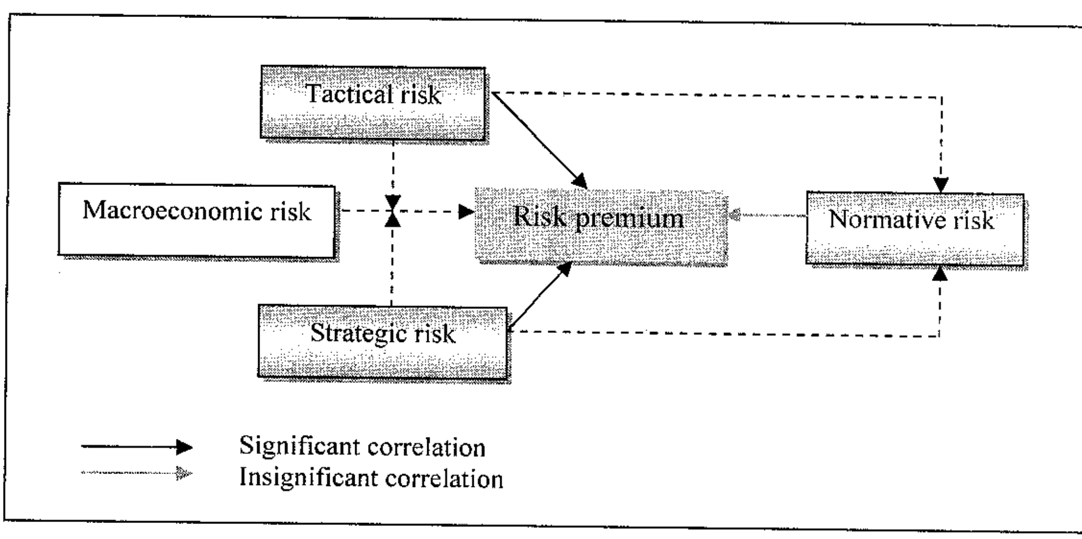


Figure 5.3: CLS risk premium model

The bivariate correlation tests on the hypotheses relating to the CLS model's postulation of the three classes of firm-specific risk indicate that managing the tactical and strategic risk have significant correlation to reduce firms' risk premium. The test on managing normative risk, however, does not yield similar significant correlationship.

Further analysis is undertaken to individually examine the significance of associations between the construct *ERM implementation* with the respective items which make up the summated scale of the construct *normative risk* in the CLS model. The objective of this further analysis is to find out which of the four items of the normative risk has contributed to the non-significance of the construct's association with ERM implementation. Table 5.1 tabulates the results of the analysis. The results reveal that even in their individual context, none of the items indicates statistically significant correlation with the independent variable, i.e. ERM Implementation, in the bivariate Pearson correlation tests. Thus, this further examination concludes that the proposed ERM implementation framework does not have significant impact in reducing any of the four elements, i.e. items d17, d18, d19, and d20, of the firms' normative risk as shown in Table 5.1. Items d17 and d18 represent the compliance and penalty aspects of the normative risk management effect whilst items d19 and d20 represent the diminishing effect of attained competitive advantages through strategic and tactical risk management as posited by the CLS model.

Table 5.1: Results of Bivariate Correlation Test Between ERM Implementation with Individual Normative Risk Items

No	Items	Statements	Pearson Coefficient (*r*)	p-value (2-tailed)
1	d17	Our enterprise is successful in complying with industry and regulatory rules	.116	.534
2	d18	Our firm will face higher risk premium if we fail to comply with industry or institutional norms *(i.e. those market rules expected by investors, regulators, interest groups)*	.251	.174
3	d19	Our firm's competitive advantages achieved through implementing ***strategic risk management*** *(i.e. structure, resource, knowledge advantages)* will be quickly matched by our competitors.	.142	.445
4	d20	Our firm's competitive advantages achieved through implementing ***tactical risk management*** *(i.e. hedging and options)* will be quickly matched by our competitors.	.230	.213

One plausible explanation for the primary reason of the insignificance correlation between ERM implementation and its effect in reducing any of the four elements of firms' normative risk is perhaps due to the fact that the scope of the defined ERM framework is relatively wide in tandem with its inherently holistic nature. For instance, in the context of this study, the ERM implementation model is made up of fourteen items (variables) where each item indicates an aspect embodying the ERM implementation model. As a result, the impact of the implementation framework's collective efficacy through its various aspects toward the four items of normative risk may have been diluted when examined in its totality. For example, the ERM's impact (in its totality) on item d17 (of normative risk) is not so obvious, conceivably because of item d17, i.e. to comply with industry and regulator rules, is generally achievable through an exclusive and more narrowly defined internal control mechanism of the PLCs as opposed to the proposed ERM program. Similar verity may have also been at play for items d18, d19, and d20 of the normative risk vis-à-vis the defined ERM implementation model.

5.5 IMPLICATIONS

5.5.1 Introductory

The crux of this study is to validate the theorized conceptual framework of the shareholders value creating ERM implementation model as portrayed in Figure 5.2. In the midst of the numerous skepticisms regarding the effectiveness and efficacy of a practical and functional ERM implementation model, the empirical evidences from the structural equation modeling and bivariate correlation investigations performed in the analytic model of this study have provided revelation (in Malaysia scenario) and attestation of such a functional ERM model. This study has offered insights into an ERM *practical framework* which attests to a predictive model (perceptual causal relationship model among pertinent constructs and their variables) for a successful implementation of ERM program by the PLCs. The ERM practical framework generates its *value creation transmission* through (i) the strategic risk premium CLS model, and (ii) the various aspects of ERM value maximization theory. The manifestation of this ERM's *shareholders value creation* is characterized by the (i) lowering of the cost of capital for the firms (lowered risk premium), and (ii) attainment of several measures of business performance (see Figure 5.1 and 5.2).

5.5.2 Implication of ERM Penetration Level Among PLCs

The mean scores frequency distribution analysis in examining the depth of ERM practices penetration among the PLCs on the Bursa Malaysia indicated that the implementation intensity is 'good' based on our semantic scale (see Table 4.3 in Chapter 4). The corresponding implementation intensity's average mean score is 3.82 on the 5-point Likert's scale; which falls in the 75^{th} percentile of the scale. The result offers an interesting insight into the penetration level of ERM practices. The result reveals that the penetration depth is rather encouraging amidst the seemingly lack of a mandatory regulatory requirement, e.g. the Bursa's *Listing Requirements*, for ERM program to be put in place within the PLCs' management structure. Recall that in the Malaysian regulatory environment, there is no specific regulatory framework in the sense of a specific rule or code for ERM. The closest reference one can get from the existing regulatory framework is perhaps the corporate risk management requirement which is 'embedded' in the Code of Governance as well as in the company's system of internal control as stipulated by the Bursa's *Listing Requirements*. But even then, the requirement for such a risk management framework is not a specific reference to ERM implementation. For instance, although the *Corporate Governance Guidelines* which was issued by the government (Securities Commission) on 8 June 2009 does have a chapter on risk management and internal control, they are merely set out as 'guidelines'. Apart from that, the Bursa's *Listing Requirements* which governs the PLCs also does not specifically touch on ERM, despite the fact that it has a chapter on corporate governance, where it covers areas relating to the setting up by the PLCs of audit committee, internal audit and etcetera.

In comparison to other regulatory frameworks such as that of Sarbanes-Oxley Act (US and Japan) and AS/NZS 4360:2004 (Australia and New Zealand), to name a few, it is apparent that the Malaysian regulatory environment's requirement for ERM is lagging behind. Albeit so, given the findings derived from the ERM penetration and implementation intensity analyses, it demonstrates a rather extensive adoption of ERM on the part of the Malaysian PLCs relative to the country's still lagging regulatory requirement. This trend attests to the fact that the PLCs are generally risk averse, risk-aware, and risk conscious. In other words, the risk culture has somewhat inculcated within the PLCs' corporate culture. This phenomenon perhaps has to do with the awful experience that the PLCs had recently gone through in relation to the 1997 Asian financial crisis.

5.5.3 Implication of ERM Value Maximization Theory of ERM

The tests on ERM value maximization theory through hypotheses H_3, H_5, H_6, H_7, H_8, and H_9 (see section 3.3.4 and Table 4.24) have ascertained the notion that value can be created in various forms of business performance through ERM implementation. This business performance can be materialized in the forms of reduced cost of financial distress and cost of external financing, improved firms' credit rating, rewards by equity market through higher premium paid by investors for company's shares, as well as reduced informational asymmetries and agency problem in the firms.

The findings simultaneously refute the supposition by the neo-classical finance theory which postulates that managing firm-specific risk is futile. The findings point out that managing firm-specific (unsystematic) risk through ERM program is able to contribute positively to various forms of business performance as mentioned above, hence creating value for the enterprises. This conclusion implies that firms should not hesitate to commit and invest their time and resources, e.g. man power, IT infrastructure, training, and etcetera, in instituting a formal and effective ERM framework within their management structure. This is because such initiatives are justifiable in managerial sense owing to their value creating capability.

5.5.4 Implication of the Strategic Conceptualization of Risk Premium Through ERM

The results of the analysis demonstrate that the effect of ERM implementation is significant in reducing firms' tactical and strategic risks as defined in the strategic conceptualization of risk premium or the CLS model. As has been defined in section 3.3.4, this study adopts the tactical and strategic risks of the CLS model as a proxy for firms' cost of capital. Thus, reducing firms' tactical and strategic risks implies the lowering of firms' cost of capital through reducing the firms' risk premium. These outcomes of analysis have also empirically validated the posited ERM value creating transmission mechanism through the CLS risk premium model for managing the tactical and strategic risks of the firms. In other words, the empirical evidence proves that the value creation transmission effect of ERM is significant for managing tactical and strategic risk of the firms. This revelation has provided insights for another mean to an effective capital management by the firms.

The above implications are reflected in the evaluation criteria of credit rating agencies in Malaysia such as that of the Malaysian Rating Agency or RAM in its rating of firms' debt securities issuance (see also sections 3.3.4., 3.3.4.1, and 3.3.4.2 in Chapter 3). In making reference and equivalence comparison of CLS risk premium model's value creating transmission mechanism to the RAM's rating criteria for instance, it affirms that reducing firms' *tactical risk* encompasses RAM's positive rating criteria for managing firms': (i) **financial risk**, i.e. profitability and coverage, funding structure, capital leverage, cashflow stability and adequacy, financial flexibility and liquidity; and (ii) **corporate governance issues**. Whereas CLS model's proposition in managing *strategic risk* embraces RAM's favorable rating for managing firms': (i) **industry risk,** i.e. growth potential, vulnerability to industry factors, barriers to entry; (ii) **business risk**, i.e. *market risk* – basis of competition, market position and size, product/service diversity, customer analysis; *operational risk* – availability of raw materials, efficiency of assets, cost structure, labor relations, credit controls, inventory management; and (iii) **diversification factor** (RAM, 2006). Table 5.2 summarizes the equivalence comparison of the dimensions and areas of risk management between the CLS strategic risk premium model and the RAM's rating criteria (see also Table 2.1 in Chapter 2 for comparison).

In a nutshell, the test results in examining the posited strategic conceptualization of risk premium which is underpinned by the CLS model have implied that Malaysian listed companies are poised to benefit from a favorable credit profile rating from rating agencies such as RAM or the Malaysian Rating Corporation Berhad (MARC) if they put in place an effective ERM program as proposed by our research framework. This is because the effect of implementing ERM program will lead to lower risk premium and hence, reduced cost of capital when firms attempt to raise fund with the issuance of various debt instruments in the capital markets.

As for the shareholders, a lower risk premium demanded for the firm's debt instruments due to lower risk profile essentially means that equity-holders can avoid sharing a bigger chunk of company's earnings with debt-holders for the latter's required rate of investment return in those securities. This leaves a bigger portion of the earnings to be made available for distribution to the equity-holders as dividend payments. This has been made possible as a result of better credit profile ratings due to the ERM implementation, thus enhancing shareholders' value in the company.

Table 5.2: Comparison of Risk Management Areas
Between CLS Model and RAM's Rating Criteria

CLS Model's Dimensions of Risk	RAM's Credit Rating Criteria	
	Risk Category	**Risk Areas**
Tactical Risk	Financial Risk	• Profitability and coverage • Funding structure • Capital leverage • Cashflow stability and adequacy • Financial flexibility and liquidity
	Corporate Governance Issue	
Strategic Risk	Industry Risk	• Growth potential • Vulnerability to industry factors • Barriers to entry
	Business Risk	• Market risk - Basis of competition - Market position and size - Product / service diversity - Customers analysis • Operational risk - Availability of raw materials - Efficiency of assets - Cost structure - Labor relation - Credit control - Inventory management
	Diversification Factor	

5.5.5 Implications in Summary

In summary, the positive outcomes of analyses in (i) the causal relationship of factors in the ERM practical framework, (ii) the ERM value maximization theory, and (iii) the CLS strategic risk premium model have far reaching implications to all parties concerned with ERM practices, namely firm's managers, shareholders, regulators, and researchers. To the firm's managers and industry practitioners, the findings have substantiated the need and validated the value enhancing effect of ERM implementation particularly in the areas of capital management and business performance. To the shareholders and investors, the findings have alleviated their doubt in welcoming firms to put in place such ERM initiatives and have reassured them of the net present value attribute of investing in ERM program by the firms. To the regulators, authorities such as the Securities Commission and Bursa Malaysia are presented with empirical evidence of the efficacy of an effective ERM implementation model and the causal relationship among all the pertinent factors within a functional ERM framework. This serves as input for the authorities to institute rules and regulations for a more robust ERM regulatory environment in Malaysia. To scholars and researchers alike, the findings should serve as impetus and reference for further research work in ERM in the quest for better insights in proposing a more refined, sophisticated and yet productive ERM implementation model to the benefit of all stakeholders especially to the corporate world.

Although the principal theoretical underpinning of the research framework in this study of ERM comes from the discipline of finance (e.g. classical finance theory and neo-classical finance theory on corporate risk management), the interpretation and generalizibilty of its empirical evidence may be interdisciplinary (e.g. strategy and corporate governance). For example, the empirical findings of this study can provide evidence and reference to the literature on corporate governance and the cost of capital. Numerous literature define corporate governance as encompassing a broad spectrum of risk management mechanism. To these literature, the ultimate aim of this risk management mechanism is linked to creating value in the form of reduction in the firm's cost of capital (Ramly & Rashid, 2010). This line of argument is similar to those expounded by this study in ERM.

For instance, the empirical results of this study and their discussion shall provide a valuable perspective to a study by Chen et al. (2003). Chen et al. (2003) examined the effects of firm-level disclosure and corporate governance quality on the cost of equity capital in emerging markets. We can interpret the firm-level disclosure in the study of Chen et al. (2003) as an effort by firms to minimize firms' idiosyncratic risk in the area of informational asymmetries as discussed in the thesis and the effect of corporate governance quality as having similar effect to the ERM implementation intensity explained by this thesis. Chen et al. (2003)'s study did not find evidence that disclosure is systematically associated with the cost of equity after controlling for some typical risk factors such as beta, size, book-to-market and etc. However, Chen et al. (2003) found that there was a significant negative effect of corporate governance on the cost of equity capital. Other study such as John et al. (2008) discussed the relationship between corporate governance with value-enhancing risk taking activities. John et al. (2008) argued that strong corporate governance would better protect investors' interest which in turn would lead to firms to undertake riskier but value-enhancing investments. This argument is in tandem with the value maximization theory of ERM implementation in the area of reducing agency problem in the firm.

The outputs of this study have contributed to the body of knowledge by filling the gap of CAPM's challenge in the field of corporate idiosyncratic (unsystematic) risk management. Specifically, the study has presented a robust ERM implementation framework whose value-enhancing efficacy is linked to a strategic model of risk premium. The findings will provide insights into validating and vindicating the role of ERM in reducing firm-specific risk profile, hence, improving corporate valuation through the reduction of the firm's cost of capital (risk premium).

The factors that the strategic model of risk premium includes are macroeconomic, tactical, strategic, and normative risks. In contrast, CAPM recognizes only macroeconomic risk which is represented by a single market factor. The arbitrage pricing theory (APT) on the other hand, attempts to improve on the CAPM model by incorporating multiple macroeconomic factors. Nevertheless, similar to CAPM, APT omits unsystematic risk factors. The findings of this study are significant contribution because the entire conceptual framework of value-enhancing ERM as espoused by this study may provide strong foundation for further discussion and research in the area of multi-factor unsystematic risk-return model.

5.6 LIMITATIONS

The data collection process described in sections 3.4 to 3.6 is a feasible way to gather data from public listed companies (PLCs) on Bursa Malaysia (Bursa) in view of the budget, time available, population size, cost of sampling errors, nature of measurement, and attention to individual cases (Malhotra, 2004, p.314-315). Of the 400 contacts made and 200 questionnaires sent out, 128 were returned and 122 accepted. The number of retained questionnaires used for analysis had satisfactorily met the criteria for generalization of the sample since the size of the data set fell within the recommended sample size of between 100 and 150 (Hair et al, 1998, pp 610-611) (see section 3.13.5).

The execution of the sampling process skewed toward top ranking PLCs on the Bursa by market capitalization. Many of the respondents were PLCs in the top 100 list, coinciding with the same PLCs which made the component members of the once benchmark 100-stock Kuala Lumpur Composite Index (KLCI) on the Bursa. Notwithstanding the authors systematically believe that the respondents made a fair representation of the whole PLCs on the Bursa, the authors nevertheless acknowledge the fact that completely believing in a truly representative sample had been selected in the survey without any reservation is erroneous.

Various factors that could have rendered biasness to the data collected might have come to play in affecting the manner in which the respondents answered the questionnaires. Among them could be that the questionnaires had been 'down-sent' to the lower- ranked officials for answers, or respondents experienced pressure from their top management to provide positive feedback, or that respondents felt anger towards top management thus led to providing negative feedback, or faced time constraint to appropriately complete the questionnaires. Manifestation of these problems during the survey process could be inevitable and this could affect the representativeness of the sample in terms of the objectivity of the responses. Nevertheless, the authors had strived to minimize the probability of misrepresentations of the sample in the population by adhering to the specific sampling techniques and approaches, as well as by paying closer attention to individual cases to detect outlier and inconsistent responses.

The findings indicated that the proposed and modified SEM models could adequately measure the improvements of an enterprise in its ERM implementation intensity and perceived ERM benefit measures, in the midst of some implementation challenges. Nevertheless imposing forethought is in order. The predictions made by the models were just recommended values. It is imperative to perceive them as insights or guidelines but not "mandatory axioms" (Khong & Richardson, 2003). Since the data collected was cross-sectional in nature, which took a snapshot of what had transpired during the moment, the parameters derived in these models concluded the conditions of the Malaysian corporate scene at that particular point in time. It could also be that the data offer reliability but not necessarily consistency.

We could conclude that the proposed and modified models fit the existing observed variance-covariance matrix well (SEM model) if they showed satisfactory overall goodness of fit measures. Nonetheless, no extra conclusion should be inferred out of that. Despite the above, the guidelines observed in developing the two SEM models, i.e. the *proposed* and *modified* models, and the insights provided by the data analysis served as an important output in determining the impact of ERM implementation intensity towards its perceived benefit measures in the midst of the negative effect of some implementation challenges.

5.7 CONCLUSIONS

5.7.1 In the SEM model analysis, two dimensions of *ERM implementation intensity* result in value creation to the enterprise by providing three areas of *perceived ERM benefit measures.* In the meanwhile, some elements of challenge during the ERM implementation process will impose a negative effect on the ERM implementation intensity. Concluding the above argument are two perceptual causal relationship models that have been developed in relating the ERM implementation intensity, perceived ERM benefit measures, and ERM Challenge. Thus the aims of this thesis are accomplished.

5.7.2 The posited causal relationships among constructs and factors in the proposed and modified SEM models indicate findings in the hypothesized directions whereby all relationships are statistically significant (H_0, H_{1A}, H_{1B}, H_{1C}, H_{1D}, H_{1E}, H_{1F}, H_{2A}, and H_{2B} are accepted).

5.7.3 Two dimensions of ERM implementation intensity, namely (1) **performance and target setting** and (2) **business function and process integration,** are crucial areas in ensuring enterprises enhance their **risk taking capability and confidence building**, facilitates **effective communication** between the enterprises and their stakeholders, and boosts **enterprise and managerial**

excellence. The latter factors (in bold) are building blocks for value creation process in driving down the enterprises' risk premium.

5.7.4 **Implementation Challenges** has a negative effect on the two dimensions of ERM implementation intensity, namely **performance and target setting** and **business function and process integration**.

5.7.5 The modified model had a better overall model fit measures than the proposed model. The modified model incorporated a second-order factor model explicitly linking the respective first-order factors to the relevant higher-order factors, indicating the first-order factors' mutual correlations with the respective second-order factors. The first-order factors were otherwise regarded as separate factors in the proposed model. The modified model did not alter the measurement model of the proposed model.

5.7.6 Since ERM implementation intensity could lead to perceived benefit measures, and the latter is a building block for reducing corporate risk premium, an effective implementation of ERM program can contribute to value creation by the enterprises.

5.7.7 Hypothesis testing on the shareholders value maximization theory of ERM implementation reveals that ERM implementation has a significant impact on reducing the cost of financial distress of the firm.

5.7.8 However, similar test indicates that the effect of ERM implementation on lowering the tax burden of the firms is statistically not significant.

5.7.9 Nevertheless, hypothesis testing reveals that an effective ERM implementation has a significant impact on reducing firms' cost for external financing.

5.7.10 A test result also indicates that ERM implementation is able to improve firms' credit rating. This effect of ERM, however, albeit statistically significant, is deemed to be mild.

5.7.11 Another test reveals a statistically significant result that implementing an ERM program in the firms will be appreciated by the shareholders. Hence, having such an effective program will be rewarded by the equity market.

5.7.12 Test on association between ERM implementation and its effect in reducing informational asymmetries that may exist in the firms shows a statistically significant correlation. The strength of this association, however, is mild.

5.7.13 The final test on the shareholders value maximization theory of ERM implementation reveals that ERM implementation has a significant impact on reducing agency problem in the firms. Securing the firms' earnings through effective ERM implementation will boost managers' confidence of their own career future in the firms, hence minimizing the agency problem between the managers and their principals.

5.7.14 Examination on the ERM value creation transmission mechanism through a dynamic / strategic risk premium model reveals that an effective implementation of ERM program can create value by way of reducing firms' **tactical risk.**

5.7.15 Similar analysis also indicates that the effective implementation of ERM program can create value through reducing firms' **strategic risk.**

5.7.16 Further examination, however, reveals that similar value creation effect cannot be attained by reducing firms' **normative risk**. In another interpretation, ERM implementation has no significant effect in reducing PLCs' normative risk.

5.7.17 The questionnaire used in the research is a reliable instrument to gauge the causal relationships between ERM implementation intensity and perceived ERM benefit measures as well as to determine the negative impact of ERM implementation challenge on the implementation intensity. The results predicted by the models will offer improved generalizability if certain constraints encountered during the data collection process can be effectively overcome.

5.7.18 There should be no issue of under-sized study in terms of sample size since the results of study have proven to be capable of producing useful results (i.e. statistically significant results on hypotheses testing). Although there are various guidelines or rules of thumb on the determination of sample size, one should realize that a rule of thumb about sample size should be put in the context of power. A rule about power simply says that one may be not having much of a chance of finding a significant relationship unless one's sample size is large enough. This is quite different from saying that one's regression is illegitimate if a rule of thumb on sample size is violated.

5.7.19 Further research along the same trajectory should be undertaken. For one, as has been mentioned in section 9.2 (see also Figure 9.2), further research could extend the practical framework by covering the entire conceptual framework to include the value creation transmission mechanism of ERM implementation. Apart from that, further pertinent research can involve:

(i) Testing the feasibility of the two models for small and medium sized enterprises (SME).

(ii) Further enhance the causal relationships of the two models by incorporating additional factors, but with model parsimony kept in mind.

(iii) Replicate and test the models in other markets (countries).

5.8 RESEARCH OBJECTIVES ACHIEVED

The research objectives and aims of this study were first being defined in section 1.10. The research methodology in these research objectives and aims to be carried out was articulated in chapter 3. The findings of the analysis were then presented in chapter 4. This study is proud to proclaim that all the research objectives and aims being set out at the onset of this thesis have been successfully achieved. Table 5.3 provides the summary for the research objectives and aims that have been set out, their achievement status and the sections in which the findings of the analysis for each of the research objectives / aims are being discussed.

Table 5.3: Summary of Research Objectives, Aims, Achievement Status and Sections Being Discussed

Research Objective	Aim	Achieved / Not Achieved	Finding Discussed in
1	to examine the depth of penetration of ERM practices among the Malaysian public listed companies	√ *Achieved*	Section 4.2
2	to investigate the causal relationship between the factors of *ERM implementation intensity* and the factors of *perceived ERM benefit measures* in the proposed ERM framework	√ *Achieved*	Section 4.9
3	to investigate the causal relationship between the factors of *ERM implementation challenge* and the factors of *ERM implementation intensity* in the proposed ERM framework	√ *Achieved*	Section 4.9
4	to scrutinize the significance of the proposed ERM implementation framework vis-a-vis reducing the cost of financial distress hypothesis	√ *Achieved*	Section 4.11.2
5	to scrutinize the significance of the proposed ERM implementation framework vis-a-vis lowering the tax burden hypothesis	√ *Achieved*	Section 4.11.3
6	to scrutinize the significance of the proposed ERM implementation framework vis-a-vis lowering the costly external financing hypothesis	√ *Achieved*	Section 4.11.4
7	to scrutinize the significance of the proposed ERM implementation framework vis-a-vis improving the credit rating hypothesis	√ *Achieved*	Section 4.11.5
8	to scrutinize the significance of the proposed ERM implementation framework vis-a-vis minimizing the equity market reward hypothesis	√ *Achieved*	Section 4.11.6

Table 5.3, continued

Research Objective	Aim	Achieved / Not Achieved	Finding Discussed in
9	to scrutinize the significance of the proposed ERM implementation framework vis-a-vis minimizing the informational asymmetries hypothesis	√ *Achieved*	Section 4..11.7
10	to scrutinize the significance of the proposed ERM implementation framework vis-a-vis the agency problem hypothesis	√ *Achieved*	Section 4.11.8
11	to examine the significance of the proposed ERM implementation framework in relation to reducing the firm's tactical risk	√ *Achieved*	Section 4.12.4
12	to examine the significance of the proposed ERM implementation framework in relation to reducing the firm's strategic risk	√ *Achieved*	Section 4.12.5
13	to examine the significance of the proposed ERM implementation framework in relation to reducing the firm's normative risk	√ *Achieved*	Section 4.12.6

APPENDIX 1
The Questionnaire

ABOUT THE QUESTIONNAIRE

Who are conducting this research?
This is a research conducted by the Faculty of Business and Accountancy, University of Malaya and the Department of Management and Humanities, Universiti Teknologi PETRONAS.

What are the purposes?
The purpose of this questionnaire is to investigate the impact and the degree of success of enterprise risk management (ERM) by the Malaysian public listed companies. It also attempts to examine the penetration depth of ERM practices among the listed companies.

What is Enterprise Risk Management (ERM)?
ERM is defined as the process of identifying and analyzing risk from an integrated, company-wide perspective. Its implementation entails a structured and disciplined approach in aligning strategy, processes, people, technology and knowledge with a purpose of evaluating and managing the uncertainties the enterprise faces as it creates value.

How will the data be used?
This data will be used to develop a predictive model to anticipate ERM successes. All information collected in the course of this study will be regarded as **STRICTLY CONFIDENTIAL**. Names of enterprises will not be mentioned in any form of publication.

SECTION A - BACKGROUND INFORMATION
Please tick your answers in the boxes provided

1. a. **Your company's name *(will be kept strictly confidential)*:**

____

Information about the business sector in which company operates:

b.
1. Consumer product ☐
2. Industrial products ☐
3. Construction ☐
4. Trading/Services ☐
5. Infra Project ☐
6. Hotels ☐
7. Properties ☐
8. Plantations ☐
9. Technology ☐
10. Oil & Gas ☐
11. Finance ☐
12. Others (specify) ☐ ____________________

Information about company's listing status:

c.
0. Non listed ☐
1. Main board ☐
2. Second board ☐
3. Mesdaq ☐

Information about company's ownership control status:

d.
1. Local ownership ☐
2. Foreign ownership ☐

Information about company's most recent financial situation (please state if in other currency):

f.		
	Paid-up capital	RM
	Annual turnover	RM
	Annual net profit	RM

2. **Information about your position:**

h. 1. MD/CEO/Director/ CFO/COO/GM ☐
2. Senior Manager / Manager ☐
3. Executive/Officer ☐
4. Other *(please specify)* ☐

____

Your department / division / unit:

____

Total years of risk management experience:

i. 1. Less than 1 year ☐
2. One to three years ☐
3. Three to ten years ☐
4. Ten years and above ☐

What are the major business risks faced by your company?

j. Forex ☐
Liquidity ☐
Credit ☐
Operations ☐
Country ☐

Interest rate ☐
IT infrastructure ☐
Non-performing loan ☐
Commodity Market ☐
Others (please specify) ☐

____

SECTION B - GENERAL INFORMATION ON ERM

Please tick your answers in the boxes provided based on the following scale references:

5	=	Strongly agree (Visibly available)
4	=	Agree
3	=	Neutral
2	=	Disagree
1	=	Strongly disagree (Vaguely available)
n/a	=	Not applicable or no comment

The following statements describe the **elements/impacts** found in your company's **risk management process**. Based on your understanding and experience of risk management in your organization, please rate the ***manifestation*** of each element accordingly.

Vaguely Manifested ⟶ **Visibly Manifested**

Item No	Description of *Elements* found in or *Impacts* resulted from your enterprise's risk management process	n/a	1	2	3	4	5
i1	Provides common understanding of the objectives of each ERM initiative						
i2	Provides common terminology and set of standards of risk management						
i3	Provides enterprise-wide information about risk						
i4	Integrates risk with corporate strategic planning						
i5	Reduces risk of non-compliance						
i6	Enables tracking costs of compliance						
i7	Quantifies risk to the greatest extent possible						
i8	Integrated across all functions and business units						
i9	Enables everyone understands his/her accountability						
i10	ERM strategy is aligned with corporate strategy						
i11	Identifies key risk indicators (KRIs)						
i12	Integrates risk with key performance indicators (KPIs)						
i13	Aligns ERM initiatives to business objectives						
i14	Provides the rigor to identify and select risk responses (i.e. risk-avoidance, reduction, sharing and acceptance)						

The following statements describe the **outcomes** of **risk management processes**. Based on your ***understanding*** and ***experience*** of risk management in your organization, please rate each element/factor accordingly.

Strongly Disagree → Strongly Agree

Item No	Description of *Outcomes* derived from ERM / corporate risk management implementation	n/a	1	2	3	4	5
b1	Enhances enterprise's ability to take appropriate risks in value creation						
b2	Strengthens management's confidence in business operations						
b3	Creates smooth governance procedures						
b4	Improves monitoring of enterprise performance						
b5	Enriches corporate reputation						
b6	Improves clarity of organization-wide decision-making and chain of command						
b7	Facilitates reporting to regulators						
b8	Improves communicating to stakeholders / shareholders						
b9	Enhances managers' ability to think entrepreneurially and innovatively						
b10	Boosts enterprise's profitability						
b11	Assists in meeting enterprise's strategic goals						
b12	Reduces expected costs of financial distress						
b13	Protects company's investments						
b14	Reduces volatility of managers' bonuses and salaries						
b15	Reduces information gap between managers and investors						
b16	Managers are risk conscious						
b17	ERM implementation has a positive impact on enterprise's credit rating						
b18	ERM helps our enterprise to be respected within the industry						
b19	ERM can minimize agency cost						
b20	Implementing ERM program will be rewarded by the equity market						

The following statements describe the **challenges of risk management implementation**. Based on your understanding and experience of risk management in your organization, please rate each element/factor accordingly.

Strongly Disagree → Strongly Agree

Item No	Description of *Challenges* in ERM implementation	n/a	1	2	3	4	5
c1	People is an area posing big challenge						
c2	Timeliness of information is a problem						
c3	There is lack of information needed						
c4	Over-regulation in organization hinder ERM implementation						
c5	There is strong competition from other type of management techniques to be implemented						
c6	There is wide discrepancy between expectation and practices in ERM implementation						
c7	There is inadequate technology support						
c8	The organization structure deters ERM implementation						
c9	There is insufficient necessary level of investment for ERM implementation						

- THANK YOU -

Thank you very much for completing this questionnaire. We really appreciate for your time spent in this survey. Should you wish to have the results of our final research, you can contact Mr. Lai F.W. via e-mail at laifongwoon@petronas.com.my.

APPENDIX 2
Additional Questions in Batch 2 Questionnaire

5. The following statements describe the **outcomes** of **risk management processes**. Based on your ***understanding*** and ***experience*** of risk management in your organization, please rate each element/factor accordingly.

Strongly Disagree → **Strongly Agree**

Item No	Description of *Outcomes* derived from ERM / corporate risk management implementation	n/a	1	2	3	4	5
b21	Reduces company's expected taxes						
b22	Reduces the cost for external financing						

How do you rate the following situations that **transpire in your company**?

Strongly Disagree → **Strongly Agree**

Item No	Description of what has transpired in your company	n/a	1	2	3	4	5
d1	ERM implementation help reduce company's overall risk premium						
d2	There is minimum information friction between the management and the shareholders						
d3	There is minimum gap of risk preference between the management and shareholders of firm's investment undertaking						
d4	There is satisfactory liquidity/free float of firm's shares traded in the stock exchange						
d5	Company uses hedging strategy heavily						
d6	Hedging strategy employed by firm is effectively meeting its intended objectives						
d7	The use of **real options** (*see* **Note**[1]) to reduce firm's earning surprises is effective and satisfactory						
d8	Management is effective in isolating firm's earnings from market forces/uncertainty						
d9	Management is effective in shaping the firm to attain and sustain its **structural advantages** (*see* **Note**[2]).						
d10	Management is effective in isolating its earnings from rivals attacks through attaining structural advantages						
d11	Our enterprise has attained **resource-based advantages** (*see* **Note**[3]).						
d12	Our enterprise's resource-based advantages has helped isolate it from market pressures						
d13	Our enterprise has attained **knowledge-based advantage** *(i.e. attain superior information from competitors regarding market situation and resources to protect earnings fluctuation).*						

d14	Our firm is able to absorb, interpret, and commercialize critical information on a timely basis which has helped to isolate its earnings from rival attack, market pressure, and technological obsolescence						
d15	Our firm has attained **strategic options advantages** (i.e. ability to diversify business line, expand market reach and product offering, acquire key supplier)						
d16	Our firm possesses a portfolio of **strategic options** (i.e. ability to diversify business line, expand market reach and product offering, acquire key supplier) which has enabled it to mitigate macroeconomic and industry disturbances risk.						
d17	Our enterprise is successful in complying with industry and regulatory rules						
d18	Our firm will face higher risk premium if we fail to comply with industry or institutional norms (i.e. those market rules expected by investors, regulators, interest groups)						
d19	Our firm's competitive advantages achieved through implementing **strategic risk management** (i.e structure, resource, knowledge advantages) will be quickly matched by our competitors.						
d20	Our firm's competitive advantages achieved through implementing **tactical risk management** (hedging and options) will be quickly matched by our competitors.						

Note:

[1] **Real option**
Real options are contingent commitments made by a firm that grant it the right to secure non-commodity resources at a later date.

[2] **Structural advantage**
Firm's market positioning in the industry resulting in advantages against its competitors in areas such as supplier power, threat of substitutes, degree of rivalry, buyer power, and barriers to entry.

[3] **Resource-based advantage**
Firm's strategy and competitive advantage in reducing demand- and supply- side risk.

Demand side risk - a firm strategize customer loyalty program such as offering better quality good and services at lower cost than its rivals to ride through cyclical downturns.

Supply-side risk - a firm forges strategic alliances with its suppliers and manage its factors of production and supply chain more effectively.

APPENDIX 3
Reliability Analysis – Scale (Alpha)

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
i1	131.07	191.467	.445	.876
i2	130.84	191.824	.488	.875
i3	130.88	189.001	.548	.873
i4	130.99	189.843	.584	.873
i5	131.11	190.731	.515	.874
i7	131.20	189.173	.476	.875
i8	131.10	190.370	.579	.873
i9	130.97	190.445	.517	.874
i10	130.96	193.230	.550	.875
i11	130.91	194.727	.415	.876
i12	131.20	192.589	.470	.875
i13	131.16	190.529	.453	.875
i14	131.12	189.233	.593	.873
c1	130.90	196.899	.229	.880
c2	131.21	203.194	-.011	.885
c3	131.59	200.095	.068	.885
c5	132.25	191.989	.292	.880
c6	131.86	205.675	-.097	.888
c7	132.16	199.642	.079	.885
c8	132.44	202.778	-.016	.888
b1	130.83	193.069	.509	.875
b2	130.74	192.278	.599	.874
b3	130.75	193.344	.572	.875
b4	130.76	193.026	.559	.875
b5	130.86	194.022	.393	.877
b6	130.95	195.336	.390	.877
b7	131.05	193.039	.448	.876
b8	130.93	190.135	.574	.873
b9	131.12	189.332	.536	.874
b10	131.36	190.513	.427	.876
b11	130.91	190.645	.600	.873
b12	130.96	191.676	.499	.875
b13	130.97	190.825	.581	.874
b14	131.18	194.314	.341	.878
b16	130.94	191.790	.537	.874
b18	131.04	192.982	.350	.878

Cronbach's Alpha = .880
Cronbach's Alpha Based on Standardized Items = .900
N of Items = 36

APPENDIX 4
Exploratory Factor Analysis – Rotated Component Matrix

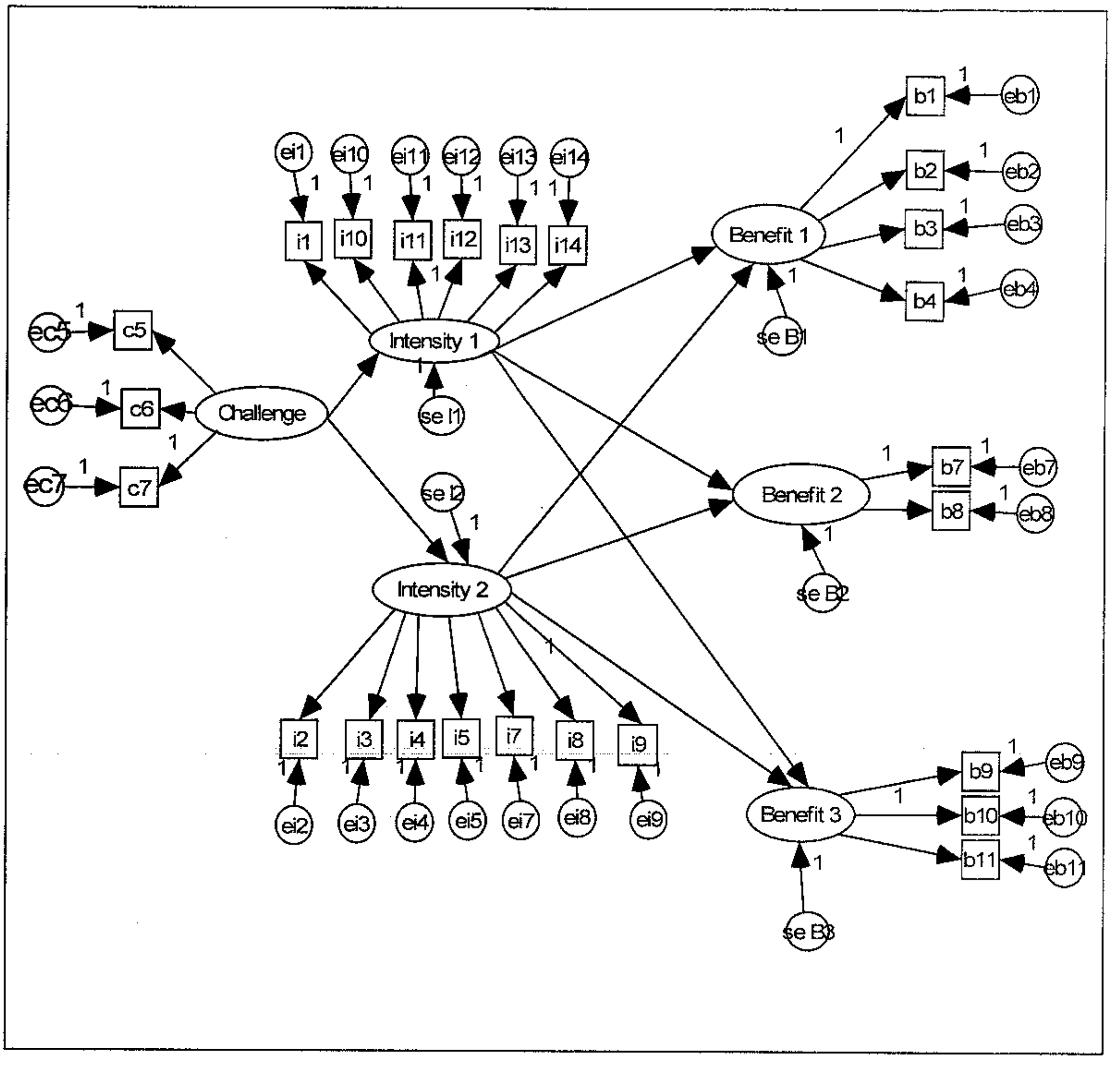
Rotated Component Matrix[a]

	Component								
	1	2	3	4	5	6	7	8	9
i1	.649								
i2		.601							
i3		.686	.448						
i4		.641							.368
i5		.579			.567				
i7		.639							
i8		.796							
i9		.537				.371			
i10	.573	.325							
i11	.666								
i12	.770								
i13	.633								
i14	.577	.356							
c1		.382						.573	
c2								.829	
c3				.374				.427	
c5				.728					
c6				.739					
c7				.830					
c8				.612					
b1			.780						
b2	.351		.688						
b3			.623		.376				
b4			.631		.337				
b5					.450	.393			
b6	.374					.301		-.390	
b7					.760				
b8					.666		.316		
b9						.681			
b10						.751			
b11			.355		.382	.573			
b12							.567	-.326	.360
b13							.492		.454
b14									.772
b16	.500		.311						
b18							.773		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 12 iterations.

APPENDIX 5
Output from AMOS of Full Path Diagram of The Proposed Model



APPENDIX 6
Standardized Structural (Path) Coefficients: (Default Model)

		Estimate[a]	S.E.[b]	C.R.[c]	P[d]	Label
Intensity 1 <---	Challenge	-.561	.103	-5.444	***	par_9
Intensity 2 <---	Challenge	-.607	.108	-5.607	***	par_10
Benefit 1 <---	Intensity 1	.458	.088	4.265	***	par_11
Benefit 2 <---	Intensity 1	.441	.123	3.582	***	par_12
Benefit 1 <---	Intensity 2	.560	.080	5.196	***	par_13
Benefit 2 <---	Intensity 2	.377	.101	3.339	***	par_21
Benefit 3 <---	Intensity 2	.365	.107	3.393	***	par_25
Benefit 3 <---	Intensity 1	.563	.145	4.297	***	par_26
c7 <---	Challenge	.699				
c6 <---	Challenge	.761	.200	4.832	***	par_1
c5 <---	Challenge	.566	.178	4.744	***	par_2
b1 <---	Benefit 1	.689				
b2 <---	Benefit 1	.788	.143	7.312	***	par_3
b3 <---	Benefit 1	.757	.134	7.103	***	par_4
b4 <---	Benefit 1	.677	.140	6.480	***	par_5
b7 <---	Benefit 2	.738				
b8 <---	Benefit 2	.770	.216	4.864	***	par_6
b9 <---	Benefit 3	.626	.165	5.315	***	par_7
b10 <---	Benefit 3	.638				
b11 <---	Benefit 3	.794	.153	5.856	***	par_8
i11 <---	Intensity 1	.611	.131	5.946	***	par_14
i12 <---	Intensity 1	.715				
i13 <---	Intensity 1	.605	.174	5.892	***	par_15
i14 <---	Intensity 1	.641	.151	6.208	***	par_16
i1 <---	Intensity 1	.587	.165	5.731	***	par_17
i10 <---	Intensity 1	.624	.118	6.059	***	par_18
i5 <---	Intensity 2	.662	.120	7.420	***	par_19
i7 <---	Intensity 2	.562	.147	6.153	***	par_20
i8 <---	Intensity 2	.804				
i4 <---	Intensity 2	.716	.113	8.127	***	par_22
i3 <---	Intensity 2	.738	.126	8.427	***	par_23
i2 <---	Intensity 2	.648	.116	7.238	***	par_24
i9 <---	Intensity 2	.589	.124	6.488	***	par_27

***Significant at all levels

Note:
a = Estimate of regression weight
b = Standard error of regression weight
c = Critical ratio for regression weight
d = Level of significance for regression weight

APPENDIX 7
Variances: (Group number 1 - Default model)

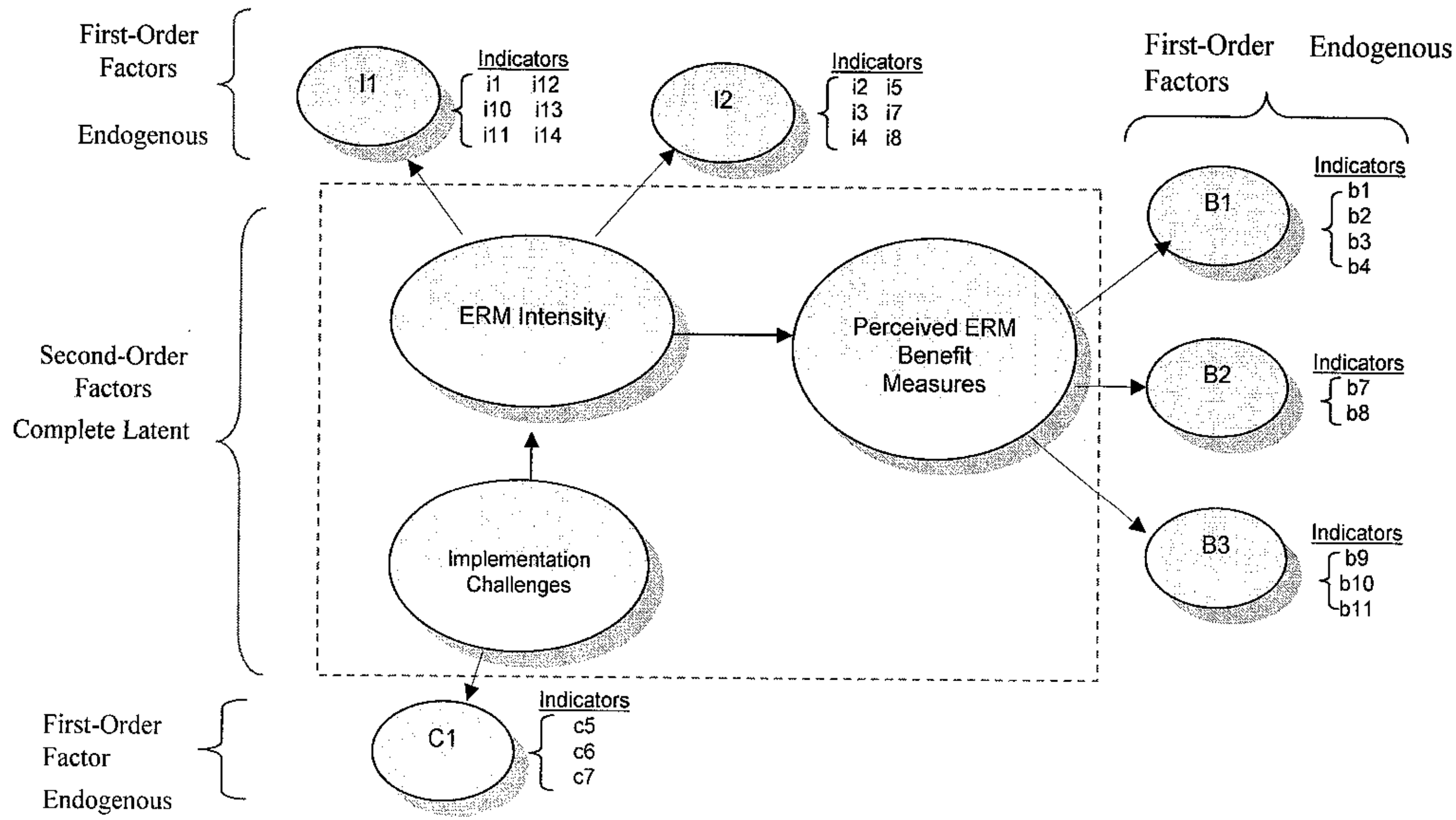
	Estimate[a]	S.E.[b]	C.R.[c]	P[d]	Label
Challenge	.713	.209	3.416	***	par_28
se I1	.327	.079	4.148	***	par_29
se I2	.400	.079	5.052	***	par_30
se B1	.104	.030	3.478	***	par_31
se B2	.218	.067	3.277	.001	par_32
se B3	.220	.072	3.064	.002	par_33
ec7	.747	.164	4.566	***	par_34
ec6	.482	.138	3.504	***	par_35
ec5	1.080	.169	6.379	***	par_36
ei1	.566	.082	6.933	***	par_37
ei10	.268	.040	6.754	***	par_38
ei11	.339	.050	6.820	***	par_39
ei12	.319	.052	6.089	***	par_40
ei13	.611	.089	6.850	***	par_41
ei14	.423	.064	6.658	***	par_42
ei8	.225	.039	5.781	***	par_43
ei7	.730	.100	7.280	***	par_44
ei5	.419	.060	6.931	***	par_45
ei4	.331	.050	6.637	***	par_46
ei3	.388	.060	6.476	***	par_47
ei2	.402	.057	6.993	***	par_48
eb1	.250	.038	6.491	***	par_49
eb2	.149	.028	5.414	***	par_50
eb3	.152	.026	5.842	***	par_51
eb4	.219	.033	6.570	***	par_52
eb7	.279	.071	3.906	***	par_53
eb8	.254	.076	3.349	***	par_54
eb9	.485	.077	6.308	***	par_55
eb10	.594	.096	6.199	***	par_56
eb11	.192	.048	3.971	***	par_57
ei9	.505	.070	7.204	***	par_58

***Significant at all levels

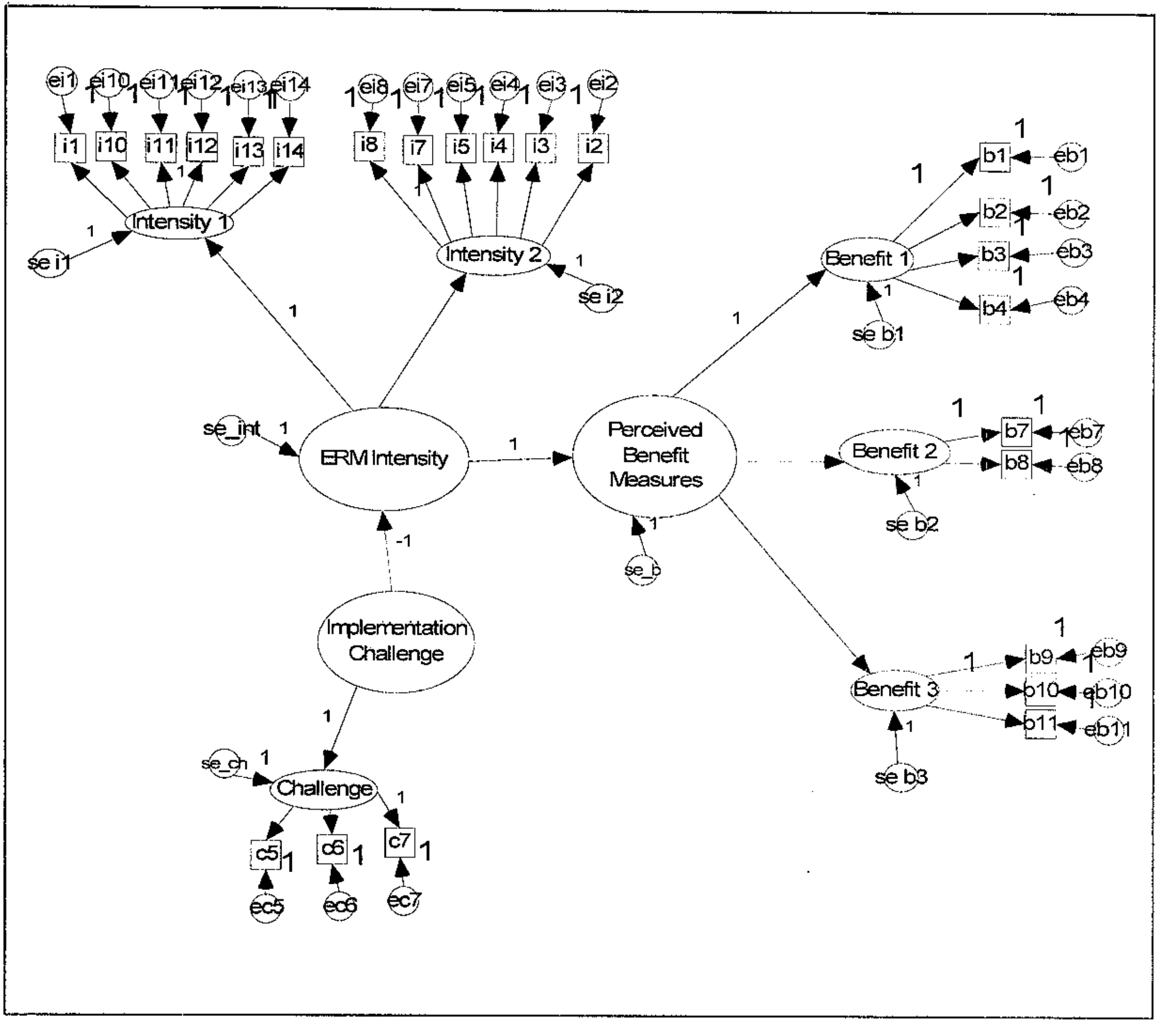
Note:
a = Estimate of regression weight
b = Standard error of regression weight
c = Critical ratio for regression weight
d = Level of significance for regression weight

APPENDIX 8

Detailed Path Diagram of Second-Order Factor Analysis Model



APPENDIX 9
Output from AMOS of Full Path Diagram of The Modified Model



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