Enterprise Risk Management (ERM) as Strategic Tool for Organizational Performance: Empirical Study in Thai Listed Companies

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Abstract

The objectives of this research are to analyze the causality among the concept of ERM determinants, implementing ERM and organizational performance. The conceptualization is constructed from contingency (Galbraith, 1973), institutional theory (DigMaggio & Powell, 1983) and incorporated with ERM standards (COSO, 2004). A mixed method, quantitative methodology through multivariate analysis with Structural Equation Modelling (SEM) was adopted to confirm between theories and data. Purposive sampling through the qualitative methodology was encapsulated by quantitative findings. With 164 Thai listed companies (population=700), the results showed that the data fits well with the theories. Moreover, the findings revealed that embedding ERM could significantly enhance organizational performance. ERM has become a buzzword from turbulent external environments, successful implement of ERM totally rests upon internal factors: leadership, organizational characteristics (risk-awareness culture) and ERM resources. Ultimately, risk management policy, governance and risk management committee are perceived as important conditions before sophisticated ERM processes to be employed.

Keywords: Enterprise Risk Management (ERM), determinants, organizational performance, Thai-listed companies

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Received: May 2, 2017. Revised: June 8, 2017. Accepted: June 12, 2017.

ระบบบริหารความเสี่ยงองค์กรในบริบทของเครื่องมือเชิงกลยุทธ์ด้านผลการดำเนินงานองค์กร การศึกษาเชิงประจักษ์กลุ่มบริษัทจดทะเบียนไทย

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บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์คือ หาความสัมพันธ์ระหว่างแนวคิดของตัวบ่งชี้ความสำเร็จของระบบบริหารความเสี่ยง การปรับใช้ (Implementation) ระบบบริหารความเสี่ยง และผลการดำเนินงานองค์กร โดยกรอบแนวคิดเชิงทฤษฎีสร้างจากแนวคิดทฤษฎีเชิงสถานการณ์ (Contingency Theory) (Galbraith, 1973) แนวคิดทฤษฎีเชิงสถาบัน (institutional Theory) (DigMaggio & Powell, 1983) ตลอดจนการใช้มาตรฐานการบริหารความเสี่ยงสากล (COSO, 2004) ด้วยวิธีการวิจัยแบบผสม นำโดยระเบียบวิจัยเชิงปริมาณด้วยการใช้การวิเคราะห์หลายตัวแปร (Multivariate Analysis) ผ่านการใช้ตัวแบบเชิงเส้น (Structural Equation Modelling: SEM) เพื่อทำการยืนยันความสอดคล้องระหว่างทฤษฎีกับข้อมูลเชิงประจักษ์และตามด้วยระเบียบวิธีวิจัยเชิงคุณภาพด้วยวิธีการสุ่มแบบเจาะจง (Purposive Sampling) ผลงานวิจัยจาก 164 องค์กร (ประชากร 700) พบว่าข้อมูลเชิงประจักษ์สอดคล้องกับทฤษฎีที่กล่าวไป โดย 1) ภายหลังจากกลุ่มบริษัทจดทะเบียนนำระบบบริหารความเสี่ยงองค์กรมาใช้ สมรรถนะองค์กรในเชิงกลยุทธ์มีทิศทางที่ดีขึ้น 2) แม้ว่าระบบบริหารความเสี่ยงขับเคลื่อนให้มีจากความวุ่นวายของสภาพแวดล้อมภายนอกองค์กร การพัฒนาระบบบริหารความเสี่ยงให้ประสบความสำเร็จนั้นขึ้นอยู่กับปัจจัยภายในองค์กรทั้งหมด ซึ่งได้แก่ การได้รับการสนับสนุนจากผู้นำ ลักษณะองค์กร (องค์กรที่มีวัฒนธรรมตระหนักต่อความเสี่ยง) และทรัพยากรที่เกี่ยวข้องกับระบบบริหารความเสี่ยง 3) ก่อนการพัฒนากระบวนการบริหารความเสี่ยง องค์กรต้องมีความพร้อมอื่นก่อน เช่น การมีนโยบายความเสี่ยง คณะกรรมการบริหารความเสี่ยง เป็นต้น

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Rationales of Study

Globalization transforms organizations from closed to open systems (Scott, 2003), which means isolated organizations or proprietorships today do not exist. Organizations alter themselves as a corporation by trying to reap the benefits of globalization with the reduction in operating costs, global sourcing, generating advanced information and communication technology, interconnecting with boundless nations and integrated with one world, which leads to a shortened transportation time. However, globalization is not a panacea (Nye & Donahue, 2000). The negative events in one organization will then have an effect on others. Corporations or listed companies, currently depend on other companies within the same and different business sectors. Therefore, even globalization produces many benefits for organizations, its pitfall is uncertain events and risks.

Risk is a critical issue, and understanding how to manage it appropriately is indispensable. The awareness of risk management at the organization level was spread after the scandals of well-known corporations: Enron and Worldcom. Worldcom's, a communication and technology company, stock price was dramatically increased due to the surge in stock demand. The number of new shareholders in Worldcom came from the performance of the company, but it was in fact deduced from the false financial statement. To protect the situation of false or constructed financial statements, US listed companies need a verified financial statement from an external auditor via the Sarbanes-Oxley Act of 2002 (SOX) passed by the U.S. Congress in 2002 to protect investors from the possibility of fraudulent accounting activities by corporations.

In the Thai listed companies environment, the Securities and Exchange Commission (SEC) forces them not only to disclose the verified financial information and accounting statement, but they also need to disclose risks factors to shareholders. SEC has its aim to protect the shareholders' rights by endorsing them to determine the risk factors before deciding to add equity. Importantly, Thai listed companies are forced to maintain a risk management system across functions, Enterprise Risk Management (ERM), to identify, assess, mitigate and monitor risks and also to disclose systematic risks to the shareholder.

Nevertheless, as described from previous scandals as well as the regulator, it initially concludes that ERM is vital; yet, the understanding of tangible benefits in a top-down view are uncertain as several organizations have a low level of participation and maturity in ERM. Historically, studying the benefits of ERM was presumably to protect business (Marchetti, 2012: 11). The benefits of ERM from previous research were about reducing operational loss, improving new product development (Mu, Peng & MacLachlan, 2009: 170), enhancing effectiveness and efficiency levels of critical processes.

Apart from positing the preventative ERM tools, organizations today implement it as they need to align with the institutional environment. Intensive regulation across business will then reflect the maturity level of the implementation of the ERM, which is why the financial institutions industry focuses on ERM more than those of others.

To close this gap, the first objective in this paper raised the challenge of the correlation between ERM implementation and its value. In addition to it being a preventive tool and institutional environment, would it be possible to employ ERM as a strategic tool to enhance the management decision making (Gates et al., 2012) and creating proactive strategic orientation (Brustbauer, 2016)? Ultimately, would it be possible for listed companies to have a better financial performance, inclining corporate governance index or shareholder satisfaction, after embedding ERM?

At least, theorists came across the benefits of ERM as a preventive loss and leaving strategic benefits of ERM; however, how to successfully implement risk is also questionable. Successful implementation of ERM elaborates from identifying, assessing, mitigating and monitoring risk; nevertheless, what are the determinants across listed companies that would directly affect the implementation of ERM? Therefore, the second objective is about the empirical study of the ERM determinants.

Even nowadays Thai listed companies have well-enhanced standards of ERM: COSO or ISO, they just put forward the principle steps of the ERM process while leaving the details of how to successfully implement the ERM across business types to the varying organizational contexts (Yaraghi & Langhe, 2011: 552). Studying successful factors for ERM is not new, but there is a lack of management theories as well as quantitative analysis. This research then considered the convergence between ERM and management theory: contingency and institutional theory in the process of the extraction of the determinants in which the previous studies overlooked this issue.

All in all, after the analysis of multiple concepts among determinants, implementation and the organizational performance via a multivariate analysis with structural equation modelling (SEM), there are both practical and theoretical contributions. For the former, the positive impact of the finding could be to increase the maturity of ERM as well as the level of cooperation from staff. For the latter, convergence between management and risk theory can encompass research implications for the future research.

Theories Construction, Conceptual Framework and Hypothesis

Enterprise Risk Management (ERM) Implementation

Implementing ERM is perceived as a mediate concept in this paper. In this section, the aim was to display how to measure such a concept through the paradigm shift of ERM.

Previously, insurance was the first industry implementing risk management (RM) while other industries were aware of RM after World War II (Crockford, 1982). RM today has altered its concept from Traditional Risk Management (TRM) to the period of Enterprise Risk Management (ERM).

Dabari and Siadi (2014: 62) considered that TRM initially applied RM to the whole organization but its process seems to be piecemeal. To be precise, TRM isolates the risk management process by separating into units, departments, projects and so on. Obviously, TRM contains pitfalls when risk needs to be somehow integrated for mitigation.

Importantly, to rectify TRM, ERM tries to cope with this limitation and proposes two keys to implement risk management systems. First and the foremost, ERM raises the consideration of the precondition of ERM before a sophisticated implementation of the ERM process as a way of identifying, assessing, mitigating and monitoring risk. Secondly, the ERM concept emphasizes risk processes across functions, units and departments rather than the isolation one.

In most Thai listed companies they perceive ERM as a day-to-day operation by using well-known standards, for example, COSO ERM and ISO31000. However, the former is more famous.

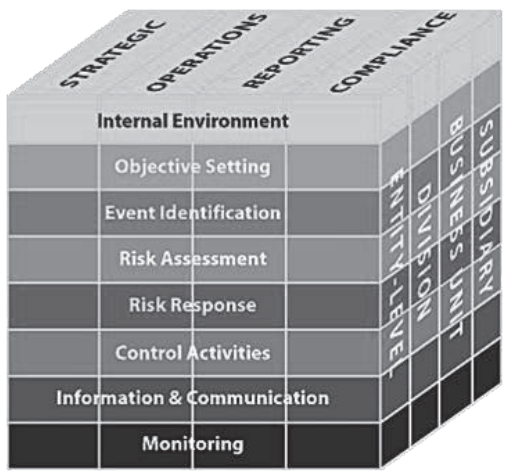


Figure 1. COSO ERM.

COSO defines ERM as ". . . 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).

Based on the definitions of ERM above, this research quantifies ERM implementation through preconditions and ERM processes. For the former, it is about setting the appropriate internal environment for ERM processes, including ERM philosophy and governance. For the latter, it composes risk identification, risk assessment, risk mitigation and risk monitoring. All variables are quantified (details in appendix a).

ERM Determinants under Contingency and Institutional Theory As mentioned, studying the determinants of the risk management process is not new; however, the problems of concern are about the lack of supportive theories as well as the unsystematic manner. Furthermore, the Thai Institution of Directors (IOD) disclosed that Thai listed companies only indicate risk factors by learning how to mitigate such risks effectively. Successful implemention of ERM will therefore be a marginal portion.

Based on previous research, most papers mention different critical success factors for implementing ERM. Nevertheless, the common factors were about leadership, risk management resources, risk culture, risk standard, organizational size, sectors, readiness of corporate strategies and so on (Gordon , Loeb & Tseng, 2009; Zhao et al., 2003). The questions are how such factors form, and which theories explaining such determinants.

To rectify this and to incorporate organization and management theories to the framework, the author determined that a classical or closed system is inadequate to explain the implementation of ERM as it could not explain the interaction between the organization and the environment (Scott, 2003). Therefore, the concept of ERM appropriately aligns with the modernism era in which the theorists try to explain the organizational phenomenon with the environment. This means to explain the implementation of ERM, internal factors would not cope with the embedding of ERM; consequently, external factors will then be included to the conceptual model. To put it simply, the author employs **contingency theory** that inserts both internal and external factors to explain the implementation of ERM. Importantly, to embed ERM, there is no one best way under the same set of determinants and any way of embedding ERM is not equally effective (Galbraith, 1973).

Likewise, besides contingency theory, the level of intensification of implementation of ERM posits differently across sectors. For example, the financial industry implements risk management systems more than the agro and food industry. To be precise, ERM somewhat relies on the

institutional environment of the firms to embed it by irrationality (DigMaggio & Powell, 1983). The author hypothesized that the number of environmental regulations will be correlated with the intensification of the implementation of ERM. Therefore, apart from contingency theory, **institutional theory** will be incorporated to explain the external factors.

In conclusion, this paper incorporated contingency and institutional theory to construct the ERM determinant composed of internal and external factors. For the former, based on previous research as well as the author's practical and theoretical experience in the field of ERM, there are organizational characteristics, leadership and resources. For the latter, there are industrial competition, volatility and institutionalizations.

Studying Value of ERM and Related Theories

The first objective in this research is about the causality between ERM implementation and its value-enhancing organizational performance. The value of ERM, previously, was at the bottom of the list of benefits. To be precise, most publications concluded the benefits of ERM as a protected loss tool. For example, Mu, Peng and MacLachlan (2009) synthesized the relationship between risk management strategy and new product development (NPD) performance. They determined that having a high maturity level of risk management could prevented loss during the NPD process.

The rationale of this paper has its aims to connect ERM with organizational performance. There are many supportive theories explaining organizational performance: model of business performance (Venkatraman & Ramanujam, 1986), classical approach of performance measurement (Sink & Tuttle, 1989) and balanced scorecard. The common dimensions from such theories define the measurements of the organizational performance as financial, operational performance, effectiveness and efficiency.

To include the maturity of the ERM as well as the level of collaboration, the value of the ERM could affect more than the bottom-line view. To put it simply, the focusing value of ERM in this paper was about the top-down view and connected with enhancing organizational performance. Recently, there have been some papers stating the tangible benefits of ERM from the top-down view as a strategic tool for organizations but having a limitation. Gates, Nicolas and Walker (2012) employed the COSO ERM framework; consequently, it could be concluded that ERM can enhance good management decision making. In addition, another recent study of ERM benefits from Brustbauer (2016) displayed the significantly positive relationship between implementing ERM and proactive strategic orientation through a structural model.

Despite substantial practical and theoretical research contributions, there is no study between implementing ERM and sustainability growth in the context of listed companies that measures the firm values as financial and shareholder performance. Hoyt and Liebenberg (2011) concluded that ERM increased shareholder value by approximately 17 percent via the measurement of Tobin's Q. Tobin's Q measures the value of a firm's asset; however, for shareholders, they interpreted stock performance via other indicators. To sustain the growth of listed companies from a shareholder perspective, stock performance should reflect how much profit firms can generate and to what extent it can return to the equity rather than that of the value of asset. To put it simply, listed companies' performance should be interpret from the ROE (Return on Equity) (Brigham & Ehrhardt, 2005). Furthermore, the Thai Institution of Directors (IOD) and the Securities and Exchange Commission (SEC) of Thailand emphasize the transparency and ethical management throughout the corporate governance (CG) index that is a vital indicator in listed companies. Eventually, this research made a contribution by challenging the previous studies by incorporating the value of ERM from the shareholder's perspective in terms of enhancing organizational performance. The prime research question included would it be possible after embedding ERM that the ROE, CG rate or even other shareholder values including those in other prior papers, were neglected.

Before the conceptual framework was proposed, the author consolidated all related theories and prior research in table 1.

Table 1. Organizing Theories, Concepts and Related Prior Research.

Conceptualization	Theories	Prior Research
ERM Implementation	COSO ERM, ISO 31000	Crockford (1982) Dabari and Siadi (2014: 62)
Determinants	1. Contingency Theory 2. Institutional Theory	Gordon, Loeb and Tseng (2009) Zhao et al. (2003) Galbraith (1973) and DigMaggio and Powell (1983)
Value of ERM	1. Model of Business Performance (Venkatraman & Ramanujam, 1986) 2. Classical approach of performance measurement (Sink & Tuttle, 1989) 3. Balanced scorecard	Mu, Peng and MacLachlan (2009) Gates et al. (2012) Brustbauer (2016) and Hoyt and Liebenberg (2011)

Conceptual Framework and Research Hypothesis

Based on theories of ERM, management and so on, there are causalities among ERM (RM) determinants composed of internal and external factors, ERM implementation (mediate variable) and, ultimately, the value of ERM from the shareholder's view in terms of the organizational performance. Indeed, apart from theoretical support, qualitative analysis through in-depth interviews with nine management executives across industries is employed to validate the path conceptual framework as well as research hypotheses in figure 2.

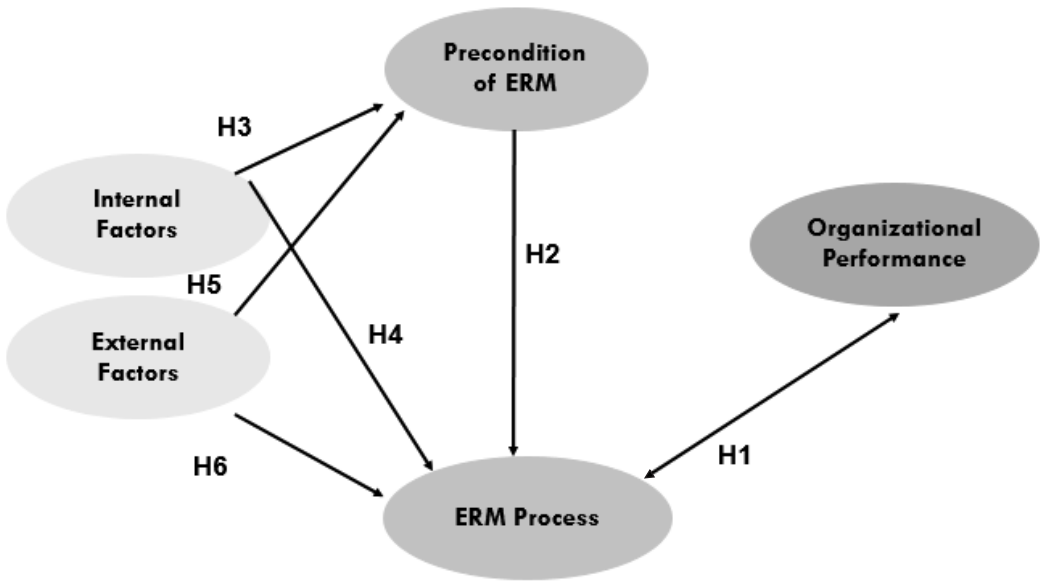


Figure 2. Proposed Path Conceptual Framework and Research Hypotheses.

H1: After implementing ERM, there is a positive effect on organizational performance.

H2: There is a relationship between preconditions of ERM and the process of ERM i mplementation.

H3: Internal factors account to some extent for the determinants of precondition of ERM.

H4: Internal factors account to some extent for the determinants of the ERM process.

H5: External factors account to some extent for the determinants of preconditions of ERM.

H6: External factors account to some extent for the determinants of the ERM process.

Methodology

The quantitative method was the main tool to determine the causality among ERM determinants, implementation and organizational performance given the multivariate analysis. As this research intentionally rested upon the attitude and preference of ERM, a survey method through a questionnaire was employed. Nevertheless, even we posit that the questionnaire has significantly high

reliability and precision; validity of the questionnaire is a concern. To rectify a lack of validity through the survey method, the author proposed two strategies. First of all, this research included some secondary data from reliable sources to reduce the bias of respondents' attitudes from the survey method. Secondly, the qualitative method was employed to strengthen the quantitative result; the qualitative method can be argued to be an alternative process of interpreting the findings (Patton & Cochran, 2002). Qualitative data was acquired through in-depth interviews. The author selected some organizations from each sector with the purposive method. The author's rationale included selecting companies, where there was a high maturity level in the ERM.

Unit of Analysis and Sampling

The unit of analysis in this studying was the organizational level. As the focus was ERM in Thai listed companies, this paper selected listed companies from the nearly 700 suitable companies across the business industries of agro & food, consumer products, financials, industrials, property & construction, resources, services and technology.

In terms of sampling techniques, due to the small population as well as the level of ERM maturity in Thailand, the author gathered data with mailed and online questionnaires. Therefore, random sampling was not included in this research. Indeed, the respondents who were competent for the process of data gathering data should directly relate to ERM accounting for the risk management committee (RMC) in the role of either top management or member of the board of directors (BOD). Moreover, apart from policy makers, respondents could be a member of the ERM department.

Alternatively, for the qualitative methodology, the author employed purposive techniques with non-probability technique. The author's rationale was to interview organizations, where they now have a better performance as well as high ERM maturity level.

The interviewees in the qualitative approach were top management (CEO, CFO ... etc.) or middle management.

Operationalization and Measurement

The most important part in empirical survey research is how to measure the conceptualization (Babbie, 2006). As mentioned, there are three concepts resting on the conceptual framework: determinants, implementation and organizational performance. Their measurement throughout a five point Likert scale is displayed in appendix a.

Indeed, reliability and validity are compulsory to ensure the effectiveness of our measurement items. For the former, it is about the measurement of the precision level of our instrument by determining the Cronbach's alpha value. According to the gathered data, it ranged between 0.78 and 0.91, which shows high reliability (Briggs & Cheek, 1986) compared to the acceptable limit (0.70). For the latter, the key is about how to measure what it is designed to measure (Kumar, 2005: 153), or validity testing. Apart from content validity via a qualitative view from ERM expertise, criterion-related validity was also tested through comparing the research measurement to ERM best practice standards like COSO or ISO. Finally, the more sophisticated technique of construct validity was dedicated by ascertaining variance observed in a phenomenon. The author employed a bivariate correlation to test the construct validity to consider how each variable correlated with the total constructive concept. Correlation is significant at the 0.01 level (2-tailed) and the Pearson correlations of the variables were high: 0.84, 0.85, 0.92 and 0.96, respectively, for internal factors, external factors, preconditions for ERM and ERM process. Therefore, validity in this research was satisfied.

Statistical Analysis

This paper employed both descriptive and inferential statistics given the adoption of multivariate analysis via Structural Equation Modelling (SEM.). Descriptive statistics are a univariate analysis by establishing data centrality (mean, medium and mode) and data dispersion (range, standard deviation).

The first inferential statistics tool is about ANOVA (Analysis of Variance) to compare the ERM performance across business industries. For SEM, secondly, it is a confirmatory, multivariate technique that posit at causal relationships between variables in a diagrammatic form (Foster, Brakus & Yavorsky, 2006). The SEM rationale allows the researcher to study causality between the observed and latent variables where the goal is to adopt a model that best accounts for the data. Moreover, as this research hypothesis focused on the causality among latent variables (internal and external factors, preconditions for ERM, ERM implementation and organizational performance) SEM can significantly fix it. Accordingly, as SEM was employed, five stages are compulsory: specification, identification, estimation, testing of model fit and modification (shown in results).

Data Procedure and Testing

There were two data sources in this research. Firstly, the primary data was mainly gathered from questionnaires.Secondly, secondary data was generated from reliable documents: listed companies' annual reports, financial statements and so on as well as the interview results. As described, multivariate analysis with SEM was employed by the researcher first to ensure that both types of data did not violate multivariate assumptions accounting for the testing of outliers, missing values, sample size, normality, multicollinearity and homoscedasticity (Hair et al., 2010). This

research initially managed some primary data as well as rectifying outliers and missing values until its sample size was approximately 164. Other assumptions of the data that do not violate multivariate analysis assumptions are as follows:

- **Adequacy of Sample Size**: Foster, Brakus and Yavorsky (2006: 105) indicated that a large sample size should be used, but it really rested upon the number of variables. Theoretically, a simple formulation that is prevalent has an adequacy sample size accounting for k(k+1)/2 where k is the number of variables in the model. In this research, there were 17 observed variables and 164 samples were adequate (17*18/2=153). The greater the sample size the better in terms of inferential population (Kumar, 2005).

- **Normality**: This research employed two methods for normality testing: normal plot and Skewness and Kurtosis statistical testing. Even though there was some positive and negative skewness from the normal plot, the statistical values of Skewness and Kurtosis from 17 variables mostly occurred between -2 to 2 (-1.22 to 1.93), which is within the acceptable limit of normality testing (Trochim & Donnelly, 2006).

- **Multicollinearity:** Having large correlations among variables could boost type I and II errors. Therefore, multicollinearity should not be more than the acceptable range. The acceptable limit of the Variance Inflation Factor (VIF) should be less than 10. From 17 variables, there were few effects of multicollinearity. The VIF value occurred between 1.70 and 6.26, which is located in the acceptable limit (VIF>10 is unacceptable).

- **Homoscedasticity:** Based on figure 4, the plot between the residual and dependent variables has no pattern. The data does not violate homoscedasticity.

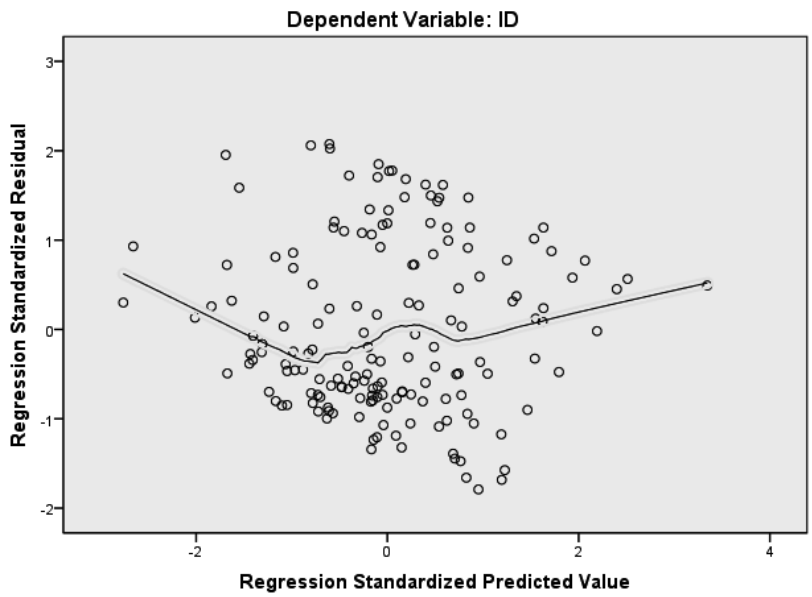


Figure 3. Plot between Residual and Dependent Variables.

Results

Characteristics of Organizations and Respondents

The rate of response in this research was 23.4 percent (164/700). However, based on the members of the Thai listed companies association, the rate of response was slightly higher than fifty percent.

From the respondents, the return rate across different industries was equally with about ten to fifteen percent, except for the financial industry where the respondents accounted for 24.4 percent. Based on the 164 respondents, 111 organizations adopted ERM standards during implementation. COSO was the most widely used ERM standard (90/111).

The respondents were both from Risk Management Committees (RMC) and Risk Management Departments with sixty-nine percent and seventy-seven percent respondents, respectively. However, some of the respondents were not directly related to risk management: auditor and investment relations (IR), for example. The majority of the respondents had graduated with a master's degree. 27.4 percent of respondents were the lower management level (senior manager, manager and assistant manager) with others as member of board of directors (BOD.) and top management (CEO, CFO, CPO and other C levels) with 7.3 and 16.5 percent, respectively.

Enterprise Risk Management Performance in Thai Listed Companies

The disclosure documents from listed companies revealed mainly risk factors. The question was how they managed such risk effectively. Before SEM is used with the research hypotheses in the next section, descriptive statistics and ANOVA were employed to compare the ERM performance.

Generally, from the empirical data, the risk identify and assessed in Thai-listed companies was high, but how the risk can be managed and monitored effectively is lower, as based on figure 4. This means that listed companies are comprehensive when setting up a risk environment, risk identification and asssessment. However, how to mitigate and monitor such risks are problems. In addition, to include the maturity of the ERM performance, listed companies needed to develop how to respond to key risks as well as the process of risk monitoring.

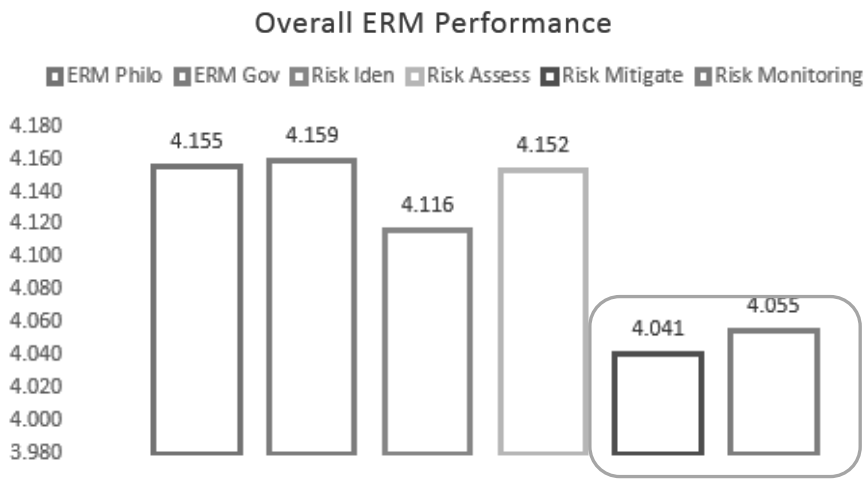


Figure 4. Overall ERM Performance.

Table 2. ERM Performance Across Business Industries.

Business Types	Precondition for ERM		ERM Process			
	ERM Philosophy	ERM Government	Risk Identification	Risk Assessment	Risk Mitigation	Risk Monitoring
Agro and Food	3.81	3.86	3.89	3.87	3.83	3.76
Consumer Product	3.92	3.83	3.83	3.86	3.81	3.69
Finance	4.35	4.35	4.30	4.28	4.18	4.28
Industrial	4.31	4.17	4.25	4.29	4.18	4.01
Property and Construction	4.15	4.21	4.02	4.06	4.12	4.18
Resources	4.26	4.26	4.06	4.20	3.98	4.08
Service	4.29	4.47	4.33	4.51	4.27	4.45
Technology	3.82	3.82	3.89	3.88	3.68	3.67
Total	**4.16**	**4.16**	**4.12**	**4.15**	**4.04**	**4.05**

Apart from the overall ERM performance, ERM across business industries was somehow different (Table 2). Based on the centrality of the precondition and process of ERM, service, finance and industrial had better performance in ERM compared to agro and food, consumer products and technology. In terms of statistical analysis (p-value=0.05), comparing means with ANOVA are shown

in table 3 (details in Appendix b) for the three phases of ERM: ERM governance, risk assessment and risk monitoring across business types with statistical significance p-values of 0.05 (sig<0.05). This means that in the three phases, there are some distinctive ERM performances across business types. However, for the other three phases: ERM philosophy, risk identification and risk mitigation, there is statistical insignificance.

Table 3. ANOVA Results for ERM Performance across Business Industries.

ERM Phase	Mean Dimension	SS	DF	MS	F Test	Sig
ERM Governance	Between Groups	8.446	7	1.207	2.178	.039
	Within Groups	86.432	156	.554		
	Total	94.878	163			
Risk Assessment	Between Groups	7.400	7	1.057	2.274	.031
	Within Groups	72.526	156	.465		
	Total	79.926	163			
Risk Monitoring	Between Groups	10.922	7	1.560	2.443	.021
	Within Groups	99.638	156	.639		
	Total	110.560	163			

Research Hypothesis Findings

SEM was the main tool for answering the research hypotheses. The procedure for SEM to fix the research hypotheses is as in the following steps (Foster, Brakus & Yavorsky, 2006):

1) Model Specification: This step employed the path diagram in which the researcher hypotheses are among the variables from previous research or theories mentioned in figure 2.

2) Model Identification: This stage is about finding factor loadings in each latent variable measurement model. It accounts for the unidimentionality of each construct composed of determinants, ERM implementation and organizational performance. Confirmatory factor analysis (CFA) was further utilized to test how well each of the variables correlated to its latent variables before examining the structural model. Based on figure 5 and table 4, the standardized estimates or factor loading from three latent variables were quite high except for the ROE from the last latent variable. However, all observed variables were significantly (P>0.05) related to their latent variable. Indeed, as mentioned in table 5, all the observed variables when given three latent variables tended to fit the data well,

since the compulsory indices (GFI, CFI above 0.90, RMSEA between 0.05-0.08, CMIN/DF<=5) were all at an acceptable value. Therefore, the CFA, determinants, ERM implementation and organizational performance were theorized to consist of all the observed variables.

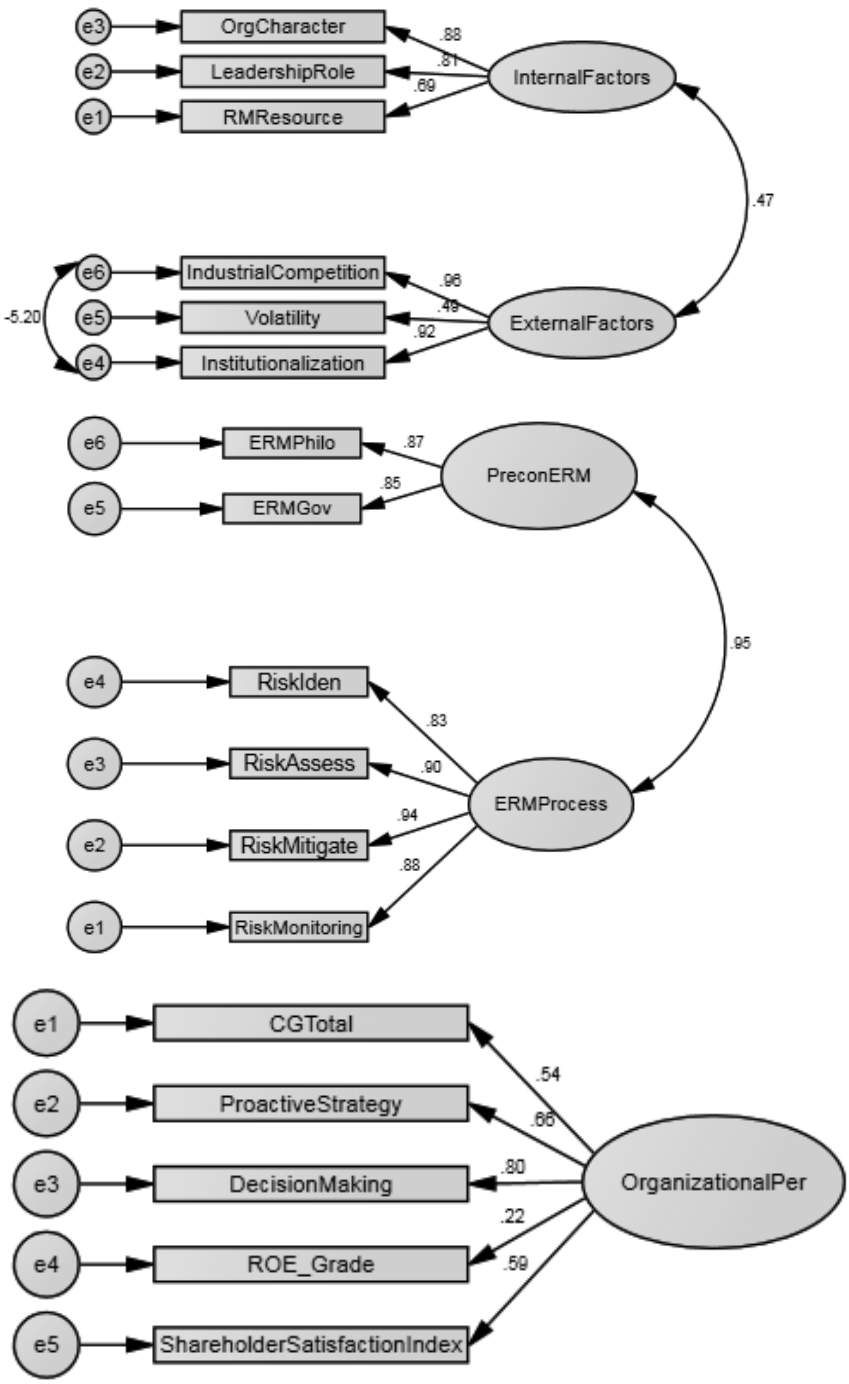


Figure 5. Measurement Model.

Table 4. Factor Loading and p-values of Observed Variables.

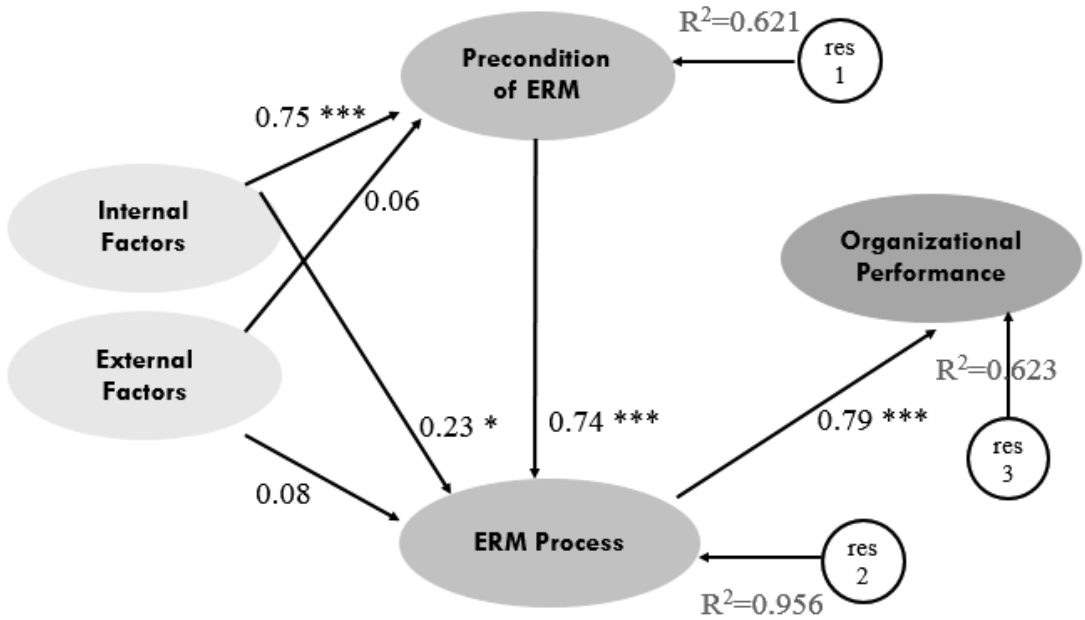
Latent Variables	Observed Variables 1		Observed Variables 2	
	Standardized Regression Weights	P-value	Standardized Regression Weights	P-value
Determinants				
Organizational Characteristic	.88	<.001		
Leadership Role	.81	<.001		
Risk Management Resources	.69	<.001		
Industrial Competition			.96	<.001
Volatility			.49	<.001
Institutionalization			.92	<.001
ERM				
ERM Philo	0.87	< 0.001		
ERM Governance	0.85	< 0.001		
Risk Identification			.83	<.001
Risk Assess			.90	<.001
Risk Mitigate			.94	<.001
Risk Monitoring			.88	<.001
Organizational Performance				
Corporate Governance	.54	<.001		
Proactive Strategy	.66	< .001		
Decision Making	.80	<.001		
Return on Equity (ROE)	.22	.014		
Shareholder Satisfaction Index	.59	<.001		

Table 5. Testing Data Fit with Indices.

Latent Variables	CMIN/DF	Goodness-of Fit Index (GFI)	Comparative Fit Index (CFI)	Root Mean Square error of approximate (RMSEA)
Determinants of ERM	1.780	.98	.980	.07
ERM Implementation	1.450	.98	.996	.05
Organizational Performance	2.617	.97	.950	.10

3) Model Estimation: After the theories were constructed via the measurement model, the AMOS (Analysis of Moment Structure) in SPSS was generated to find the appropriate parameter.

4) Model Fit Test & Model Modification: The most important part in this research was to fix the research hypothesis from the structural model in figure 6. Path analysis as well as the goodness of fit indices were displayed simultaneously. Based on the path conceptual model (figure 2), there were two exogenous variables (internal and external factors) and three endogenous variables accounting for the preconditions for ERM, ERM process and organizational performance.Initially, the result showed that the hypothesized model analysis did not fit the empirical data throughout the validation of the given fit indices. After modification via the correlated errors among the observed exogenous and endogenous values, the model finally fitted the data with CMIN/df= 1.746, GFI= 0.9, CFI= 0.951 and RMSEA= 0.06, in which all the fitted indices were in the acceptable range limit, as shown in figure 6. From figure 6 and table 6, from all six paths, four of them exhibited strong positive and significant effects between each latent variable as mentioned in the hypothesis. Four of the path coefficient-regression weights were significant at the levels of 0.001 to 0.05 (hypotheses 1-4) (*** p<.001, ** p<.01, * p<.05). Indeed, the explanatory power also accounted for a high percentage of variance in the model. The SEM model displayed about 62.1, 95.6 and 62.3 percent of variance in the endogenous variables of the preconditions of ERM, ERM process and organizational performance, respectively. To be precise, a high value for the squared multiple correlation performed had good predictability for the dependent variable from the independent variable.



Chisquare= 193.789 df= 111 p= 0.0
CMIN/df= 1.746, GFI= 0.9, CFI= 0.951 and RMSEA= 0.06
* p<.05, ** p<.01, *** p<.001

Figure 6. Structural Model.

Table 6: Standardized Regression Weights of Structural Model.

Research Hypothesis	Regression Weights	Standardized Regression Weights	P-Value	Interpretation (Compared to Sig 0.05)
ERM Process → Organizational Performance	.60	.79	<.001	Support Hypothesis
Precondition of ERM → ERM Process	.82	.74	<.001	Support Hypothesis
Internal Factors → Precondition of ERM	.749	.75	<.001	Support Hypothesis
Internal Factors → ERM Process	.25	.23	.012	Support Hypothesis
External Factors → Precondition of ERM	.08	.06	.56	Reject Hypothesis
External Factors → ERM Process	.11	.08	.19	Reject Hypothesis

Conclusion

This part aims to interpret and discuss the research results. Based on the empirical result of the ERM performance across business industries, they did not fully employ ERM as an end-to-end process. From the results, Thai listed companies have a low level of maturity in mitigating and monitoring risks compared to other steps. Furthermore, risk management across business industries was found to be significantly distinctive, especially for governance, assessment and monitoring risks. Service, finance and industry sectors were the three doing very well in the ERM process. The next question is about what are the factors effecting ERM performance.

The rationale of this study is about challenging previous studies of tangible benefits of risk. To put it simply, could it be possible, beside preventive tools from ERM, that ERM can significantly be a strategic tool enhancing the organizational performance via the measurement of corporate governance (CG) index, well-informed decision making, proactive strategies and financial and shareholder performance. Furthermore, after finding a causality between ERM and its benefits, determinants are the next study topic through the construction of contingency and institutional theory.

To conclude, the collected empirical data fitted a model with acceptable statistical indices that gives high explanatory power. First and foremost, based on the first hypothesis as well as the first research question, it can be concluded that after embedding ERM, organizations performed better. Based on the organizational performance, the theoretical model in this research accounted for the level of corporate governance, good decision making, proactive strategies and financial and shareholder performance. To be precise, under the context of Thai listed companies, ERM was found to be significantly associated with organizational performance; therefore, ERM can posit as a strategic tool. Indeed, due to the significant relation between preconditions of ERM and the ERM process (based on the second hypothesis), implementing ERM without appropriate preconditions of ERM composed of ERM philosophy and ERM governance, the embed ERM cannot ensure the organizational performance.

After positing the strategic benefits of ERM, the next research question concerned ERM determinants. The rest of the hypotheses were conformed under two important organizational and management theories: contingency and institutional theories relating to the research question that either internal or external organizational factors are the ERM determinants. The finding illustrated that although all observed variables were significantly related to the internal and external factors, only the internal factor was found to be significantly associated with both preconditions of ERM and ERM process. Contrarily, for the external factors, they were all insignificantly related to the ERM implementation. In summary, successful implementation of ERM is associated with organizational characteristics, leadership role and risk management resources, which were all internal factors.

Discussion, Policy Recommendation and Future Research

Discussion

Firstly, under the context of Thai listed companies, from the empirical data, it can significantly prove that ERM can enhance organizational performance. The greatest benefit of ERM is about helping management to make good decisions. Next, ERM can assist listed-companies to gain strategic advantages, thus increase competitiveness and business. Such two tangible benefits are presented in the prior studies from Gates, Nicolas and Walker (2012) and Brustbauer (2016). Additionally, to make a practical contribution, a high level of ERM can improve the management more in terms of transparency, accountability and ethics since they have a positive correlated with ERM and corporate governance index. To summarize, a high maturity of ERM can significantly enhance management strategies.

Nevertheless, it was discernable that the ERM performance in Thai-listed companies cannot sustain long-term performance because of the low level of explanatory power between the implemented ERM and financial performance. To put it simply, ERM did not relate much to stimulate ROE. A high level of maturity for ERM could not guarantee the amount an organization can generate in return. However, presumably, a good ERM system could somehow be linked to generating a ROE after doing the ERM cycle more than once: identifying, assessing, mitigating and monitoring risk. Yet, mitigating and monitoring risk needs to improve in Thai listed companies.

Importantly, ERM has become a buzzword for external factors: institutional environment, preventing loss from the rapid environment change, volatility, industrial competition and so on. Successfully implementing ERM can be empirically related only to internal factors, for example, supportive leaders, risk awareness culture, readiness of corporate strategic plan and ERM resources. External factors constraint (Selznick, 1948), while institutionalization does not impact much on how successful is the implementation of ERM. Moreover, the service, finance and industry sectors performed better in ERM by not just having a rigid regulator as they also had a good internal environment.

Finally, the former paradigm of ERM only focuses on risk management processes via the ignorance of the appropriate environment. However, this research's empirical result aligns with the distorted new paradigm of ERM that preconditions or even infrastructure of ERM are indispensable. This finding also supports the well-known standard of risk management: COSO ERM. For this standard, the internal environment is the first step for setting up the ERM system.

Policy Recommendation

The maturity level of ERM in Thai-listed companies is not very high when compared to other countries in Asia. Moreover, the concept of ERM in public organizations is very new and is not implemented yet in some organizations. The results in this paper can benefit them in the process of increasing the ERM maturity level via the following recommendations:

- Based on the significant correlation between organizational performance and implementing ERM, organizations should communicate and display such tangible benefits of ERM to the risk management committee, management level and all staff to increase the level of cooperation.

- The level of participation from internal staff is the most advantageous factor for embedding ERM since all determinants are internal factors. Internal factors were found to significantly affect the embedding of ERM when accounting for organizational characteristics, leadership role and risk management resources. The most critical internal factor for successful implementation of ERM is about the leadership role. Prior, leaders did not pay much attention to the risk management process, as previous research did not prove the top-down benefit of ERM. However, after understanding the top-down benefits of ERM, leaders will be more involved in the ERM process. Accordingly, leaders can create a risk awareness culture and provide a supportive ERM resource by setting up a risk department, adoption of ERM standard or hiring a risk consultancy. All mentioning factors are critical factors for implementing ERM. - The risk management team should provide the level of risk appetite, the readiness level of risk management policy and procedures as well as the readiness and autonomy level of the Risk Management Committee before a sophisticated ERM process is kicked off. Even risk management processes, such as identifying, assessing, mitigating and monitoring risk, are indispensable as preconditions of ERM.

- Finally, Thai-listed companies should do ERM as a cycle of identifying, assessing, mitigating and monitoring. However, based on empirical data, mitigating and monitoring risks are at low levels of maturity compared to identifying and assessing risk. The author will then recommend them to have a good systematic response to key risks. The COSO ERM standard suggests four solutions to respond to risks: treatment, transfer, tolerance and termination of risks. To enhance the risk monitoring system, apart from risk policies and procedures, key risk indicators (KRIs) are compulsory to lead ERM in a dynamic way.

Future Research

First and foremost, the objective in this study mainly focused on the positive effects between embedded ERM and organizational performance by ignoring internal and external factors related to the organizational performance. Therefore, future research should explore those causal relationships.

Next, the limitation in this research is about its focus only in a very limited way to measure organizational performance in Thai listed companies. By this, there are many variables related to organizational performance. To put it simply, measuring organizational performance is a multifaceted process in which future research should incorporate others to the conceptual framework.

Thirdly, the aim of this research was about studying the environment of ERM in Thai listed companies across eight business industries. It accounted for the generalization process; however, the next research should consider very specific industries. Or, researchers should do a comparative study about ERM performance in each industry. This can somehow answer why and how the financial industry has a better performing in ERM than the other industries.

Finally, related to the theory construction, apart from contingency and institutional theories that rests upon internal and external variables, there are other organizational and management theories: population ecology, resource dependence and inter-organization-relation theories (Scott, 2003), for example. To be precise, future research could use such theories to construct the conceptual framework.

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Appendix

a) Measurement Items

Conceptualization	Variables	Measurement Items
Internal Factors	Organizational Characteristic	■ The degree of risk awareness culture. ■ Readiness of corporate Strategic Plan.
	Leadership Role	■ The supportive level from leadership in risk management process ■ The degree of communication and involvement from leadership in risk aspect.
	Risk Management Resource	■ Determined mandate of resources in ERM. ■ The level of resources to ERM.
External Factors	Industrial Competition	■ The degree of industrial competition. ■ The degree of new entry coming to business.
	Volatility	■ The sensitivity of global economy and politic to industry. ■ The sensitivity of nation economy and politic to industry. ■ The degree of uncertainty in the industry.
	Institutionalization	■ The degree law and regulatory influence. ■ The degree of isomorphism process. ■ Institutionalization.
Precondition for ERM	Risk Management Philosophy	■ The precise degree of determined risk appetite. ■ The readiness level of risk management policy and procedure.
	Risk Management Governance	■ The readiness level of risk management committee. ■ The autonomy level of risk management committee.

a) Measurement Items (Continued)

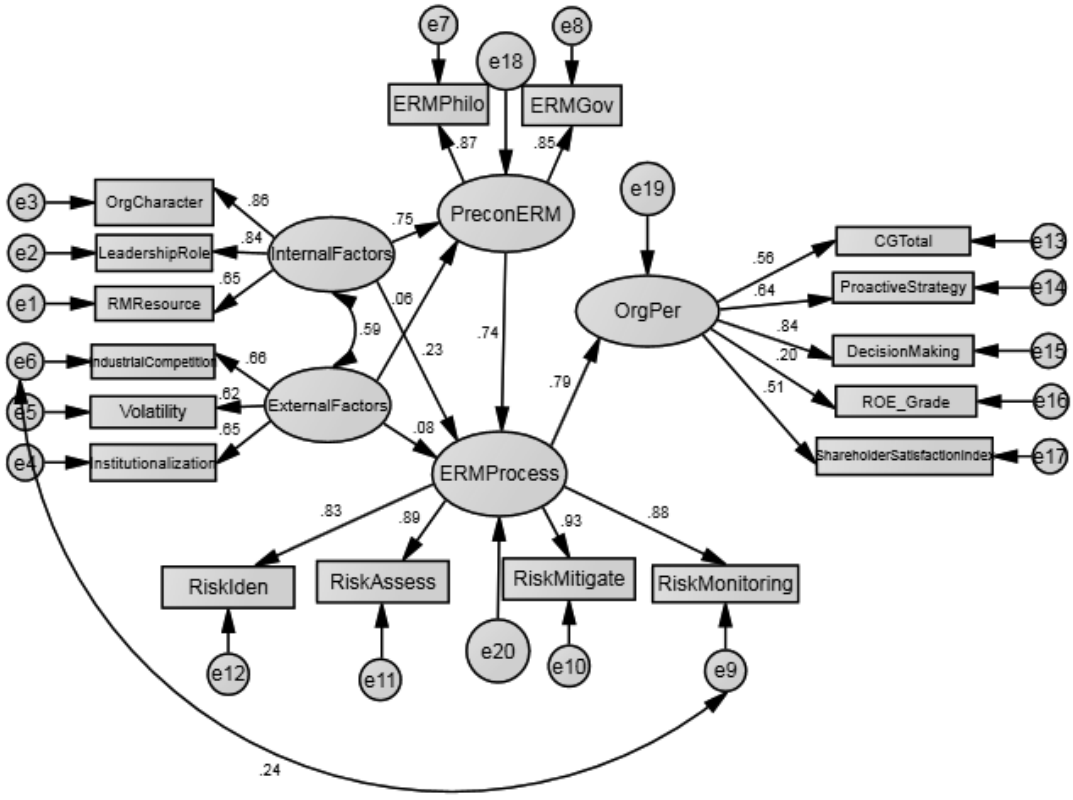
Conceptualization	Variables	Measurement Items
ERM Implementation	Risk Identification	■ The linkage level between potential risk event and corporate views. ■ The comprehensive level of identifying risks from external and internal factors. ■ The readiness of supportive tool for ERM identification: risk categories, etc...
	Risk Assessment	■ The degree of systemic approach of quantify risk from likelihood and impact . ■ The degree of sophisticated assessment methods: qualitative and quantitative methodology. ■ The degree of assessing inherent and residual risks.
ERM Implementation (CON)	Risk Mitigation	■ The comprehensive level of risk response strategies: avoid reduce, share and accept. ■ The Linking Objectives, Events, Risk Assessment, and Risk Response. ■ The readiness level of control or risk mitigation plans.
	Risk Monitoring	■ The frequent degree of risk monitoring in firms key risks. ■ The variety of risk monitoring tools: for example, Key risk indicators (KRIs), dashboard, etc... ■ The variety level of monitoring types: ongoing monitoring activities, separate evaluation, internal and external audit review.
Organizational Performance		■ CG Index ■ Decision Making ■ Proactive of Strategic Plan ■ ROE ■ Shareholder Satisfaction Index

ANOVA Result

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
ERMPhilo	Between Groups	7.717	7	1.102	2.034	.054
	Within Groups	84.568	156	.542		
	Total	92.285	163			
ERMGov	Between Groups	8.446	7	1.207	2.178	.039
	Within Groups	86.432	156	.554		
	Total	94.878	163			
RiskIden	Between Groups	5.615	7	.802	1.676	.119
	Within Groups	74.666	156	.479		
	Total	80.282	163			
RiskAssess	Between Groups	7.400	7	1.057	2.274	.031
	Within Groups	72.526	156	.465		
	Total	79.926	163			
RiskMitigate	Between Groups	6.220	7	.889	1.706	.111
	Within Groups	81.270	156	.521		
	Total	87.490	163			
RiskMonitoring	Between Groups	10.922	7	1.560	2.443	.021
	Within Groups	99.638	156	.639		
	Total	110.560	163			

b) SEM Result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