

Determinants of Enterprise Risk Management

----A Case Analysis on Telecommunication Company

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ABSTRACT

Enterprise risk management (ERM) is vital in corporation management; however, there exist problems in risk control. This article discusses the challenges in risk control process on the basis of scholars' conclusions and models, developing approaches to help enterprises struggle with risk management. Based on operational risk-control assessment (OpRSA), a methodology for risk analysis and control, enterprises can follow certain processes implied by the model. The telecommunication industry is analysed on the basis of OpRSA procedure, along with statistics and graphs. Furthermore, future researching directions are predicted in the report, suggesting various possible fields combine with ERM in the near future.

Keywords: Enterprise risk management, corporate culture, training courses.

1. INTRODUCTION

As more volatility is imposed on the landscape of the business world, the term of enterprise risk control has been brought up since 1990s and has been a critical concept in corporation management ever since. As an interdisciplinary researching field, there is more importance attached to modern science literary in terms of management (Alexander, 2013). It is the basic goal for every company to maximize shareholder's wealth. Financial performance has a variety of determinants, including asset usage, comparative productivity and team's leverage on finance (Angell and Brewer 2017, cited in Otegunrin et al. 2021). Risk is something that one has not the capability to control and is difficult to avoid to some extent. It is natural for firms to have the intention to minimize risks in the operation and management. However, there are obstacles during the process of risk control, because too many factors are involved and to find the most crucial determinant is sometimes a difficult job in daily work. Furthermore, there is lack of accurate measurement of ERM, mainly because the process is related to individuals; thus, emotional factors and relationship among people are involved.

Although scholars have done plenty of research on enterprise risk control and approaches related to financial industry, there is not much articles of insights in other industry. This report applies OpRSA to telecommunication industry and indicates future research directions.

The enterprise risk control could be divided in different fields within an enterprise, including marketing, finance, human resources and sales. For instance, in financial areas, managers often focus on the risks that exist in interest rate and fluctuation of currency (Kloman, 2010). The role of enterprise risk management has impact on the link between operational excellence and variables of risk-related studies (Muazu, Tasmin & Javaid, 2021). Chances are that there is a positive relationship between ERM and the performance of a firm (Otegunrin et al. 2021).

2. LITERATURE REVIEW

This section provides a basic summary of previous researches and conclusion in terms of the evolution of enterprise risk management (ERM). Most of enterprise risk management disciplines and scholarship are rooted in the field of finance and insurance, such as banking and securities. Global-level institutions and

organizations are emerging, such as the COSO framework and the Basel II framework (Adam, Soliman & Mahtab, 2021). ERM is considered as a paradigm from a 'silo-based' approach to take risk under control (Gordon, Loeba, & Tseng, cited in Adam, Soliman & Mahtab, 2021), upgrading the ability for a firm to manage risk and minimize risk as well as expanding their market and promoting their performance. There are abundant investigations with different outcomes (Adam, Soliman & Mahtab, 2021). Some groups found that there are no evidence between ERM and performance of enterprises, while other groups drew a different conclusion that ERM is positively related to the performance of an enterprise.

2.1 The background of ERM

Enterprise risk management is a kind of potential losses due to insufficient and failed operational procedures, people management, equipment maintenance and systematic operation from both external and internal events (RuizCanela, 2021). Recently, the world is paying great attention to the concept of ERM in order to achieve a more effective approach to manage enterprise risks in regard of a complete vision of a company (Adam, Soliman & Mahtab, 2021). Arena et al. (cited in Adam, Soliman & Mahtab, 2021) also mention that scholars are interested in various disciplines relevant to ERM. Regulations on ERM are implemented on enterprises and banks around the world. The central bank of Nigeria (CBN), for instance, issued a Supervisory Framework for banks and securities as well as other financial organizations in the past few years. People working in the field of finance and strategy management are taking ERM into account when it comes to making crucial decisions on the organizational scale (Adam, Soliman & Mahtab, 2021).

Firms in various geographic locations and different sectors are adopting the procedure and measurement of ERM, which is a sign of the growing interest in the term (Adam, Soliman & Mahtab, 2021). As ERM is occupying more percentage of the measurement systems of multinational firms, it is predictable that risk control would be a mainstream in the near future when it comes to analyse a corporation's value as well as its performance. For instance, Beasley, Clune, and Hermanson (2005, cited in Adam, Soliman & Mahtab, 2021) conducted a study based on 123 firms all over the world. Results are that half of the sample firms had implemented ERM systems into their routine measurement either on a complete level or a partial

degree, while only 35 percent of the firms were ignorant of ERM implementation or had not make schedules on conducting an ERM procedure.

2.2 Conceptual framework for ERM

ERM index model interacts with various components and determining factors, including, but not limited to, CAMELS model in terms of both quantification and qualification (Adam, Soliman & Mahtab, 2021). Combined together, both of the quantified and qualified measurement and methods, along with components of decisive factors involved in CAMELS, formulate the model of ERM index (Adam, Soliman & Mahtab, 2021). This model concerning ERM themes and CAMELS components involves risk organization and governance, risk insight and strategy, risk processes and decisions, risk monitoring and reporting as well as capital adequacy, asset quality, management soundness, earnings and profitability and etc., creating a bunch of determinants of ERM.

As sustainability is becoming an increasingly vital problem in regard to enterprises and institutions, scholars have developed a VIKOR approach in order to measure the degree of ERM of small and medium-sized businesses (Sun et al., 2021). This method is established so as to deal with the decision-making process within a firm, relating to indefinite weights of each decision-maker and standards (Sun et al., 2021).

2.3 Conventional risk control

Risk control is a topic that shareholders are paying attention to in the current world. There are more evolved approaches in regard to ERM, while the term risk management emerges at a time when corporation realized the importance of risk control. In previous evolution of organization systems and capital structure, risk management has always been imperative in traditional approach. Kraus and Lehner (cited in Otegunrin et al., 2021) consider the term of risk management traceable to the beginning of 1940s and 1950s. Until the middle of 1990s, it establishes a 'silo-based' approach in terms of ERM. According to Dickinson (cited in Otegunrin et al. 2021), this 'silo-based' approach is a kind of traditional risk management (TRM) including individual risk management in a disaggregated system.

Traditional risk management is based on individuals, while the feature of TRM can be a drawback. Eikenhout (cited in Otegunrin et al. 2021) points out that personally managed process can be inefficient based a single person. There is not much

evidence and assistance from others and the external world. One has the right and responsibility to determine everything, while the truth is that it is hard for a person to get a complete picture all the time.

2.4 ERM implementation

The implementation of ERM has gathered plenty of attention from professionals and workers of all fields such as banking, securities and insurance. In various domains, ERM projects are attached to great importance (Anton & Nucu, 2020). However, not all of the firms deal with risk control problems. For instance, Anton & Nucu (2020) argue that only 75 percent of enterprises cope with issues related with ERM; at the same time, only 24 percent have already implemented ERM at all levels of routine operation and management. Furthermore, there are several methods used to measure whether firms apply ERM to practice, namely hiring announcement, keywords in database relevant to ERM. ERM ratings and direct survey (Anton & Nucu, 2020).

3. CHALLENGES OF ERM

This section enumerates several challenges of enterprise risk management that matter the most in regard to an organized corporation, including internal challenges and external ones. Internal challenges are those within an organization, such as corporate culture, while external challenges refer to fierce competitions in the market. These challenges present great obstacles on the way to managing an enterprise successfully as well as organizing employees in order to play out their potential talents. It is necessary to identify these challenges in the first place so that there are chances to conquer these obstacles against creating a harmonious and stable economic environment.

3.1 Accurate measurement

When ERM is implemented within a firm, there would be issues possibly resulting from the own characteristics and features of the risk control process. ERM is sometimes an invisible variable that is difficult to quantify because it is often implemented on the base of personal subjectivity and the criteria is vague to some extent. Due to the feature of ERM, it is hard to conduct accurate measurement and precise criteria. While ERM is getting more attention, there are more challenges and assessments from researchers and stakeholders.

3.2 Agency problems

Agency problem is the conflict between owners of an enterprise, namely stakeholders and managers who is hired by the stakeholders in order to maximize their profit while operating the organization. However, there would be issues when their interests do not match. Managerial attitudes on risk-taking and controlling is indicated to have impact on corporation risk management agency issues (Smith & Stulz, cited in Otekunrin et al. 2021). It is recognized as a strong force in business landscape (Jarrow, 2008).

4. CASE ANALYSIS

As challenges have been enumerated, it is feasible for an enterprise to manage those risks through a variety of methods that are consistent with the organizational culture. Leaders and directors should develop some approaches to encounter those problems related to risk control. After setting down the strategy, the company could stick to their plan, ensuring that the enterprise risk is always under control.

In this section, an operational risk self-assessment (OpRSA) is introduced to evaluate the performance of an enterprise. The OpRSA procedure conducts evaluation on the basis of quantitative results and analysis whose inputs are economic influences and other factors (José, 2021). Based on the model, a company whose main project is relevant to telecommunication is analyzed in terms of economic risk and financial floatation within the management process of the corporation

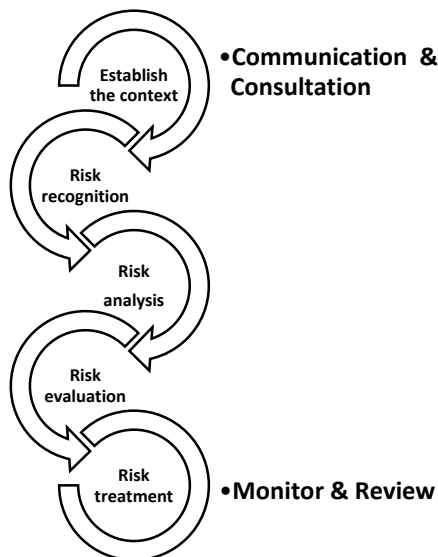
4.1 Operational risk assessment

Operational risk is a broad topic, consisting various factors within a corporation. Jarrow (2008) divides operational risk into two types: the risk of loss resulting from system such as transaction failure and office error, as well as the one due to incentives such as agency cost.

In order to explain OpRSA method, it is necessary to understand how to build this process: risk identification and evaluation as well interviews based on brainstorming are the base or tools for establishing the model. Arena et al. (cited in José, 2021) have analysed a case based on a variety of telecommunications services providers in order to prove the importance and effectiveness of risk self-assessment, connecting ERM with business strategies and helping with decision-making process for shareholders. José (2021) mentions two internal

components that are closely related in the OpRSA: an operational risk self-assessment process (OpRSA process) and an operational risk self-assessment method (OpRSA method).

One vital determinant of OpRSA is the definition of operational risks which includes various types and indexes. For the creation of a common criteria among organizations and institutions, the definition of operational risk is identified through the benchmarks in regard to domains of financial and securities, forming a framework (José, 2021). The classification and identification of this risk typology list out all the management failures and losses as well as possible

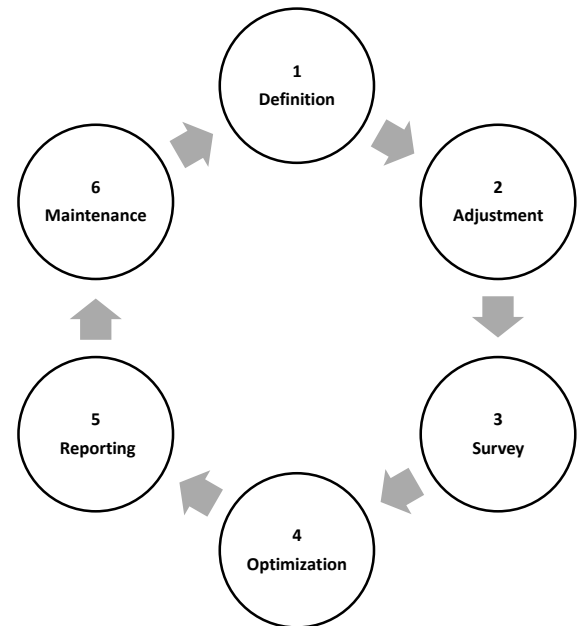


risky events, which are considered the main inputs and factors determining the results (José, 2021).

Figure 1 The risk management process. Source: José (2021)

Another component of OpRSA is how to evaluate the management risks based on the definition of what the risks refer to. In terms of OpRSA, as long as the risks are thoroughly recognized, managers of an enterprise will start to gather statistics and information, spreading questionnaires and thinking over the optimal approach to conduct the survey. After deciding which type of survey to adopt, operators apply these data gathered through various channels to the model, performing a quantitative analysis of the estimations in regard to economic influences and the probability of event occurrence; thus, the expected losses and unexpected ones as well ranking and rating degrees in terms of risk management can be shown (José, 2021). Tumuhairwe and Arthur (2016) indicate that there is a positive relationship between records on procurement compliance, risk control effectiveness as

well as operational performance. They (Tumuhairwe & Arthur, 2016) also point out that the records on compliance and risk management effectiveness are crucial predictors in regard to the performance and



presentation of management.

Figure 2 OpRSA Process. Source: José (2021).

4.2 Analysis On Telecommunication

To apply the OpRSA procedure to an enterprise in the field of telecommunication, there are assumptions to stick to: the operational risk-assessment method (OpRAM) is in accordance with enterprises, operational and technical transformation that are in fast pace, because there would be delay if a model which is mainly based on historical data is applied; OpRAM in firms of similar characters and scales exists (José, 20 21).

The design and collection of questionnaires are of priority. Managers need to respond to the questions in terms of economic factors such as expected loss (EL) and unexpected loss (UL) (José, 2021). The former refers to the profit loss in a specific period of time, while the latter means the losses that have not been expected, but happens during certain issues. After the questionnaires are created and the definitions are set, the statistics collected need to be processed, namely data processing (José, 2021). Based on what have been collected and gathered, the risk thresholds can be concluded thereafter, indicating the degree of its risk

levels in terms of ranking and rating classes. There are several indicators to choose when evaluating the risk threshold, including, but not limited to, gross margin, gross revenue and total cost.

Table 1. Example of threshold based on EI

Indicator	1000MM €		
Percentage	99%	98%	97%
Expected value	990 MM €	980 MM €	970 MM €
Threshold	10 MM €	20 MM €	30 MM €

Source: José (2021).

From the table, the risk would be acceptable if the losses are no more than €10 MM; the risk would be manageable if the losses are larger than €10 MM but are smaller than €20 MM; The risk would be catastrophic if the losses are larger than €30 MM (José, 2021).

At the same time, there are several steps to apply the model to telecommunication industry. Yang and Mannan (2009) identify three vital components, among which the third state (abnormal detected and under repair) sojourn time distribution is acquired through distribution fitting with industry indexes.

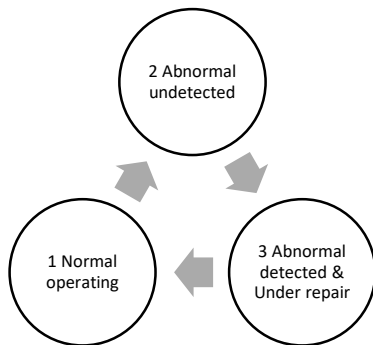


Figure 3 Component state flow diagram. Source: Yang & Mannan, 2009

As evaluating telecommunication industry, the determinants are closely related to these three components: normal operating, abnormal undetected, and abnormal detected and under repair. An exponential distribution density function is presented as follows (Yang & Mannan, 2009). Yang & Mannan

$$f(x; \lambda) = \lambda e^{-\lambda x}$$

(2009) define X as a random variable featuring the sojourn time of normal operating.

$$(1)$$

When the inspection interval is T, and Y is a random variable in terms of abnormal undetected, the

$$P(Y < y) = \frac{e^{-\lambda(T-y)} - e^{-\lambda T}}{1 - e^{-\lambda T}}$$

function changes into (Yang & Mannan, 2009):

$$(2)$$

There are three components are in the study scope, namely pump, control value (CV) and level transmitter (LT), formulating a distribution parameter regarding with eight distributions (Yang & Mannan, 2009).

Table 2. Distribution parameters of eight distributions fitted to components

Distribution	Pump – Parameters	CV – Parameters	LT – Parameters
Exponential	$\lambda = 0.11744$	$\lambda = 0.16901$	$\lambda = 0.32258$
Exponential (2P)	$\lambda = 0.13307$ $\gamma = 1.0$	$\lambda = 0.29268$ $\gamma = 2.5$	$\lambda = 0.90909$ $\gamma = 2.0$
Gamma	$\alpha = 0.23273$ $\beta = 36.586$	$\alpha = 0.98773$ $\beta = 5.9901$	$\alpha = 7.3923$ $\beta = 0.41935$
Gamma (3P)	$\alpha = 0.33912$ $\beta = 24.11$ $\gamma = 1.0$	$\alpha = 0.51275$ $\beta = 6.7362$ $\gamma = 2.5$	$\alpha = 0.46567$ $\beta = 1.754$ $\gamma = 2.0$
Lognormal	$\sigma = 0.99585$ $\mu = 1.4947$	$\sigma = 0.64201$ $\mu = 1.5107$	$\sigma = 0.30246$ $\mu = 1.0832$
Lognormal (3P)	$\sigma = 1.3804$ $\mu = 1.0937$ $\gamma = 0.82505$	$\sigma = 6.7709$ $\mu = -0.46155$ $\gamma = 2.5$	$\sigma = 0.78934$ $\mu = 0.04695$ $\gamma = 1.7088$
Weibull	$\alpha = 1.1698$ $\beta = 7.0744$	$\alpha = 3.7703$ $\beta = 3.8824$	$\alpha = 4.2115$ $\beta = 2.8792$
Weibull (3P)	$\alpha = 0.54255$ $\beta = 5.7422$ $\gamma = 1.0$	$\alpha = 0.61366$ $\beta = 2.5638$ $\gamma = 2.5$	$\alpha = 0.88087$ $\beta = 1.1366$ $\gamma = 2.0$

Source: Yang & Mannan, 2009

5. FUTURE AGENDA

As the research on ERM is prevalent in today's business landscape, it is necessary to make predictions on future research directions in terms of enterprise risk control process. Combined with social issues and economic tendency, several potential trends are listed.

First, the measurement and accurate criteria of ERM would be developed. If a firm tends to implement ERM in practice, there should be rules and standards to follow, or it is difficult to practice the risk control procedures within a company that has various departments dominating different issues.

Furthermore, organizational culture would be brought up when it comes to analysing the risk control process of an enterprise (Anton & Nucu, 2020). Investors are paying much attention to unique organizational behaviours, because individuals from various companies tend to behave in a totally different manner. It is observed that a lack of study in organization culture relating to ERM exists (Saeidi et al., cited in Anton & Nucu, 2020).

Thirdly, the effectiveness of energy usage and sustainability conditions of a firm would be emphasized. Currently, as more importance is attached to environmental protection and sustainability awareness, corporate social responsibility is becoming a mainstream in the business world. Firms are encouraged to post their CSR report to the public and shareholders, illustrating their practices and plans with regard to ecosystem, including, but not limit to, switching to humane employment strategies from traditional ones, paying attention to the environment and getting involved in philanthropic projects. Additionally, Anton and Nucu (2020) point out that the past studies mainly focus on financial departments such as banking and insurance. Chances are that firms in other domains like energy recycling and environmental protection sectors will attract attention.

6. CONCLUSION

There is a general framework and analysis method, along with the positions and ideas held by scholars from various fields, including, but not limited to, management, finance, financial risk management. It is common to have different or even conflicting views against the topic on ERM. Shareholders and enterprises are laying emphasis on the risk control in the ever-changing world, intending to minimize the risk and avoid potential loss when it is possible to identify the risk in the first place. This report reviews main points made by researchers in terms of the topic

of enterprise risk control process, organizing those positions and theories. It also extracts certain challenges organizations are facing these days, such as difficulties when it comes to measurement and agency costs emerging in the process of managing risk. Chances are that future research direction would possibly address these obstacles while implementing ERM procedures into practice during daily routine. Furthermore, OpRSA is a methodology used to analyse risks of enterprises. The essay applies this model to telecommunication industry in order to acquire a deeper understanding. A final prediction on the future research directions sheds light on the general and broader picture of ERM development and its history.

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