

## **Moderating Effects of Risk Management Function on Determinants of Enterprise Risk Management Implementation in Malaysian Oil and Gas Sector: A Conceptual Framework**

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### **Abstract**

Enterprise Risk Management (ERM) has been recently acknowledged as one way out of economic crises the world is experiencing. This development is important as it has accounted for some business success stories after the 2008 global financial crises. Despite all the ups and downs in oil and gas sector, the global economy are still suffering from emerging risk incidences such as dwindling oil prices, pipeline explosions, refinery shut down, employee accidents and new regulations. Malaysian oil and gas sector is not an exception, as it has faced and is still experiencing some of this risky turbulence. Hence, the objective of this study is to propose a framework to effectively gauge ERM implementation, via evaluation of four independent variables, which is moderated by risk management. Previous studies conducted on ERM in Malaysia were mostly on financial institutions, manufacturing sector, measuring performance and firm's value analysis. It is due to this gap, this paper develops a conceptual framework for a study within the oil and gas industry. The research gap is by taking a departure from all those saturated areas to the petroleum industry with concern to ERM implementation intensity, particularly the Malaysian oil and gas sector. The postulated determinant variables to be examined in the study are firm characteristics, information technology, staff capacity and regulatory framework, using risk management function as a moderating variable, involving major oil and gas industry players, namely Petronas and Hess Corporation. The outcome of the study is to evince that there is positive and strong moderating influence of risk management function on relationships between the determinants towards ERM, within oil and gas industry in Malaysia.

*Keywords: Implementation, Drivers, Enterprise-Risk-Management, Risk, and Oil-and-Gas industry*

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### **1.0 Introduction**

Companies around the world are using risk management to address and reduce the effects of the continued emerging uncertainties caused by natural and human factors on their businesses. In recent years, there are positive arguments as to the benefit of risk management to organizations (Ping & Muthueloo, 2015). Risk management is one innovation area that firms could apply into their business

process and operation, in ensuring sustainability. Firms have to edge on their respective sustainable competitive advantages to encounter business turbulence or crisis, in order to sustain operational excellence (Rosmaini *et al.*, 2016). Many companies globally, suffered from the financial crisis experienced in recent decade. Failures of large financial services companies during the global financial crisis of 2007-2008 has led to legislation and regulations requiring an increased role for ERM (Robert & Anette, 2016). ERM has gained grounds since after the financial meltdown of the late 2000s. Companies with more mature risk management practices outperformed their peers financially during the global financial crisis (EY, 2012). These outstanding performance elements have indicated the need for ERM in organizations.

Many Malaysian businesses suffered from the financial crises of the late 90s, which may be connected with poor risk management practices (Soltanizadeh *et al.*, 2014). As result of the end of the 90s' incidence and that of the 2008 global financial crises, it is now evident that Malaysian firms adopt ERM but few industries implement it to the full scale (Yusuwan, Adnan, Omar, & Jusoff, 2009). In a survey conducted on Malaysian public quoted industries by Soltanizadeh *et al.*, (2014) shows that 32.2% of them fully implement ERM, 47.2% have a partial ERM framework, 13.1% have no formal ERM framework in place but plan to implement one in the future, 4% still trying to figure out the need for ERM and 3% have no plans to have ERM at all. The study further indicates firms from industries such as infrastructure, hotel, and technology are more active when it comes to ERM implementation and perhaps that is why they are thriving.

ERM has become an emerging trend in the business world today. According to Culp (2008), ERM is viewed today as one of the major features of successful companies which allow firms to view all risks facing them through some form of common plan. As the business strategy is key to firm's success, so is ERM implementation is emerging importance to firms' successful business undertakings. As viewed by Stanton, (2012) ERM is that process by which organization identifies and analyses threats, examines alternatives and accepts or mitigates those threats. These threats commonly understood as risks are often viewed by different people in a varying dimension, some view it as an opportunity while majority looked at it as a negative influence on business undertakings leading to negative outcome. This negative outcome such as loss of profit and many others are avoidable with ERM because it is a value adding technique that is aimed at generating additional profit for a company by giving an overview of all risky activities, constructing recovery plans and constant monitoring of day-to-day operations (Lukianchuk, 2015). ERM is therefore concerned with mitigating and exploring risk factors causing variations in business outcome variables that are sometimes touchstones for understanding business value and firm performance.

ERM is an essential part of routine business activities in the oil and gas industry. Oil and gas companies face risks ranging from volatile commodity prices, which are less linked to basic supply and demand but more to global socioeconomic factors, to increased health, safety, and environmental pressures occasioning from past and recent major incidents negatively affecting the environment, industry image, and its social lease (IDC, 2013). They further consider business interruption, pollution, injuries to people, and damage to properties (bunkering and pipeline vandalization) as intrinsic risks in a usual oil and gas business. Other additional risks of new government regulations that are stricter on non-compliance, royalties and of major cost that besieges large construction projects are so common in the oil and gas industry. In addition, information technology related risks such as Stuxnet virus and the more recent cyber threats which target oil and gas companies in the Middle East (IDC, 2013). Some of these risks highlighted are peculiar to certain regions, continents, and countries of the world and cannot, therefore, be globally generalized. These are just a few examples of the serious risks and threats that can influence the successful operation of oil and gas companies.

The continued need for firms to perform efficiently and out-perform competitors exposes them to more vulnerable business situations. In a study conducted by Egbuji (1999), it posits that since businesses are constantly faced with the need to manage change within their organization, they are likely to face challenges. According to the study, this change generates choice and that choice always carries risks. Hence, the need for ERM in organizations, especially if amongst their objectives is to perform technically, financially and competitively. This coincides with the report by Aabo *et al.* (2005) where they postulate that it became evident that risk was considered as one of the primary threats that, if dealt properly, could turn out into an opportunity.

It is important to note that ERM is not only about protecting business, but also about making it better, such that it allows businesses to realize their potentials, reduces costs, eliminate overlaps and gaps, and develop plans to manage, accept, or capitalize on certain business opportunities (Li & Nadeem, 2012). These activities could help to improve firm performance and value if properly coordinated and implemented. The implementation of ERM benefits firms by decreasing costs of production and stock price volatility, increasing capital efficiency and creating synergies between different risk management activities (Beasley, Pagach, and Warr, 2008; Miccolis and Shah, 2000; Meulbroek, 2002; Cumming and Hirtle, 2001; Lam, 2001). ERM is said to promote increased risk awareness, which facilitates better operational and strategic decision-making. Firms that engage in ERM can better understand the aggregate risk inherent in different business activities (Hoyt, Moore & Liebenberg, 2008). This according to them provides firms with a more objective basis for resource allocation, thus improving capital efficiency and return on equity.

ERM implementation has been critical to many in the business world today. It is one thing for a firm to appreciate the benefits of ERM and it is another most important thing to implement it intensely. ERM implementation involves certain activities, these activities as stated by Taylor (2005), Boehm (1991) and Tummala *et al.* (1997), are the main components in ERM process, they are risk identification, risk analysis, and evaluation, risk controlling, and risk monitoring. These components or rather activities are clear indicators of ERM implementation in firms. Another concern for the ERM implementation intensity is the risk perception and profile nature of firms. Notwithstanding the components of risk management, there are factors that could influence the decision by a firm to intensely implement the ERM to the fullest or not.

## **2.0 Justification for the Study**

The aim of the study is to determine the effect of ERM's drivers on ERM implementation of the oil and gas industry in Malaysia. Firms that are targeted in this study are Bursa quoted oil and gas firms residing in Malaysia whether locally owned or internationally.

These are the firms that play a critical role in oil exploration, production, refining, distribution, and marketing that aid in the economic development of the country. A survey on the level of ERM implementation in Malaysian public quoted firms by Soltanzadeh *et al.*, (2014) had shown that 32.2% of the industries surveyed are fully implementing ERM, 47.2% have a partial ERM framework, 13.1% have no formal ERM framework in place but plan to implement one in the future, 4% still trying to figure out the need for ERM and 3% have no plans to have ERM at all. Industries such as infrastructure, hotel, and technology were more active when it comes to ERM implementation, and perhaps that is one major reason they are thriving. However, the study did not cover the oil and gas industry of the Malaysian economy that is contributing enormously to the GDP, a sector that employs a lot of people and with great potentials.

This study's findings would assist firms in developing relevant policies that would guide them in; capacity building for staff on ERM, allocation of resources to strengthened risk management functions, putting in place information technology that will be used in risk management units and improving compliance with regulations on ERM implementation. This study's findings will evince company directors on the benefits of having a specific office and officer saddled with the responsibility of coordinating ERM functions in the firm. It would strengthen their foresight on exploring new business opportunities and possibly avoid such investments that lack high potential gains. The findings from this study would assist directors of companies in carrying out their duties and in making strategic decisions that affect business operations.

The findings from this study would provide additional knowledge to investors that will assist them in the investment decision. The effect of ERM drivers on its implementation would provide additional information that could be used by firms to leverage on opportunity exploration. Similarly, the study would also cover various types of risks and potentials risks in the Malaysian oil and gas sector. Such information would be useful to investors in determining the level of risks facing petroleum-based firms in Malaysia. Regarding regulatory framework, literature will also show investors the body responsible for regulating the industry and the various stages involved. Hence, this study would go further to explore regulatory challenges that might determine the effectiveness of ERM programs and what needs to be done to address these challenges.

The findings from this study would be useful to the management and all staff in various firms in the following way; implementation of ERM structures, building capacity for staff and designing integrated risk management functional departments to manage risk in organizations. Similarly, this study would be useful to all managers heading risk management functions in Malaysia. Through establishing the effect of staff capacity on ERM implementation of firms, managers would be able to identify appropriate and effective methods to use in building staff capacity on ERM within their firms. This study is useful in the development of functional risk management structures within an organization that are needed to improve capacity on ERM.

Finally, the findings from the study will contribute to the body of knowledge by identifying how Malaysian firms manage risks in a local setting. An ERM framework for research, policy makers, professional and chief risk officers would be formulated that will help in guiding further research, appraise current risk management system and provide a basic model for new policies and guidelines in changing business environment.

### **3.0 Scope of the Study**

This study would cover the oil gas firms registered with the government of Malaysia as a local company or international company. Oil firms that are publicly quoted in the Malaysian Bursa as at 31<sup>st</sup> December 2016 would be selected. The listed oil and gas firms would be chosen because they are legally obligated and guided by certain regulations and therefore would have a structure in place that is functional. This is so because their yearly financial reports would reflect a fair view of risk management position and therefore are more reliable than the ones of firms not listed by Bursa.

A census of all the Malaysian Bursa listed oil and gas firms that are in the database would be selected, and from each firm four officers, an Assistant General Manager and managers would be chosen purposively from finance, audit and risk departments. In most cases, they are in one way or the other involved in risk management and therefore could provide reliable information on the subject matter. The criteria to be used in choosing the target population is that all the oil firms that operated within the said

period up-to 31<sup>st</sup> December 2016 would be chosen. And whether a firm has been quoted for the past 20 years but was delisted before December 30<sup>th</sup> 2016 would be excluded in this study. The study would cover four key ERM drivers (firms' characteristics, information technology, staff capacity and regulatory framework) that determine ERM implementation intensity of the Malaysian Bursa listed oil and gas firms. This is so because it would not be possible to look at all the factors that influence effectiveness and intensity of ERM implementation.

#### **4.0 Literature Review**

This study arises from the quest to understand and establish the relationship between the ERM drivers (factors) and its implementation intensity in the oil and gas sector. ERM implementation affects the performance of a firm by reducing setbacks arising from business complexities, unpredictable business environment, and evolving risks. However, studies in Malaysia show that there is still need for ERM implementation amongst firms even after the global financial crises of 2007-2008 (Yusuwan, Adnan, Omar & Jusoff, 2009) and still there are emerging risks that are technically affecting the operation and success of businesses, specifically the oil and gas industry. These risk factors, such as dwindling oil prices, staff safety and health, oil spillage and the environment, reservoir and storage risk, agitations from host communities, royalty payment, economic crime, cybercrime, and cases of fraud, are still evolving. The continuous rise of the emerging risks and its weighty effects on the successful operation of the oil firms may be connected with ineffective and inefficient ERM implementation in the sector.

Empirical evidence on the effect of ERM drivers on ERM implementation in the academic domain, particularly in Malaysia is scarce, most of the studies on ERM concentrated on the impact or effect of ERM on firm performance (financial or nonfinancial) and or firm value. In a research carried out in Kenya's oil marketing companies by G a i c u h i e (2015), the study tries to establish the effect of inland transport risk management strategies on the financial performance of 50 companies. The result of the study indicated that internal auditing, risk planning, risk assessment and portfolio quality have a significant relationship with the financial performance of the oil marketing companies in Kenya. In another development, a conceptual framework was developed for a study on Malaysian SMEs specifically automotive industry. The researchers, Salleh Hudin & Abdul Hamid (2014) focused on understanding the influence of risk management (RM) drivers particularly the corporate governance, compliance to rules and regulations, pressure from external auditors, firm and industry characteristics, internal factors, acknowledgment of RM potential benefits, emergence of new business trends, occurrence of risk events, and vulnerabilities of small and medium enterprises (SMEs) on ERM adoption.

There are many studies carried out by scholars on drivers of ERM activities. Studies like that of Liebenberg & Hoyt (2003), their study was on identifying the drivers of ERM adoption. They sampled firms with the intention to adopt ERM by hiring a Chief Risk Officer (CRO) who will be charged with the responsibility of implementing and managing the ERM program. Their findings show that more-leveraged firms are inclined to appointing CROs. Hence, it is an indication of risk management commitment by an organization. Equally, Pagach & Warr (2011) examine the characteristics of firms that adopt ERM using chief risk officer (CRO) hires as a determinant for ERM adoption. Study results indicate that firms with weaker stock performance, strong leverage, higher instability in earnings and a CEO whose compensation increases with stock unpredictability were more probable to have a CRO to supervise risk management activities in the organization.

Other studies such as the one conducted by Bertinetti, Cavezzali & Gardenal (2013) took a different dimension, their study was double tailed, in a way they try to establish how ERM implementation affects firm value on a sample of 200 European companies, belonging to both financial

and non-financial industries. Equally, they tested to understand which drivers influence the adoption of an ERM system in these organizations using regression and logit to analyze their data respectively. Their findings show that there was positive and significant relationship between ERM adoption and firm value, where firm size and profitability were found to be significant drivers.

A study by Dabari & Saidin (2015) examined the intensity of ERM implementation in the country's banking sector, taking internal audit effectiveness, human resource competency and regulatory influence as independent variables. The result revealed that there is a positive significant relationship between all the dynamic antecedents (internal audit effectiveness, human resource competency and regulatory influence) and the stage of ERM implementation with 89% full implementation while ERM partial implementation is only 11%.

A study conducted on the level of ERM implementation among Malaysian quoted industries by Soltanizadeh *et al.* (2014) shows that majority of the firms under the study adopted ERM but ranges between those who implement it to the fullest and the ones that have a formal framework and plans to implement it. The industries covered under the survey were consumer products, construction, industrial products, trading/services, finance, infrastructure, technology, hotels, properties, and plantations. The study findings show that infrastructure, hotel, and technology' level of ERM implementation is higher. The main issue here is, the survey neglected the oil and gas sector of the economy which becomes this study's concern.

Studies on ERM implementation intensity in Malaysia are still scarce, however study conducted on ERM practices in Malaysian public listed companies by Lai & Samad (2011) investigated the intensity of ERM implementation in the country. The study found out that the level of ERM acceptance in the country was on the right direction using variables such as financial distress costs, low tax burden, costly external financing, agency problem and information asymmetry as drivers of ERM implementation through product moment correlation tests. The result showed that ERM implementation has significant positive relationship with all the postulated variables. However, it does not use the variables chosen in this study, equally, it does not use structural equation model and specifically in the oil and gas sector of the Malaysian economy.

Several studies on ERM were from the financial and accounting perspectives, which looked at financial performance indices like return on assets or investment, dividend per share, market valuation and other financial leverages. There seem to be little or lacking research on management field in the ERM research and practice as argued by Bromiley *et al.* (2015). They, therefore, postulated that management researchers could hammer on ERM in areas such as temporal dynamics in risk management, implications of the level of analysis on ERM research, assessing risks in strategic settings, and ERM implementation. Hence, this current study finds it as another gap for conducting this research.

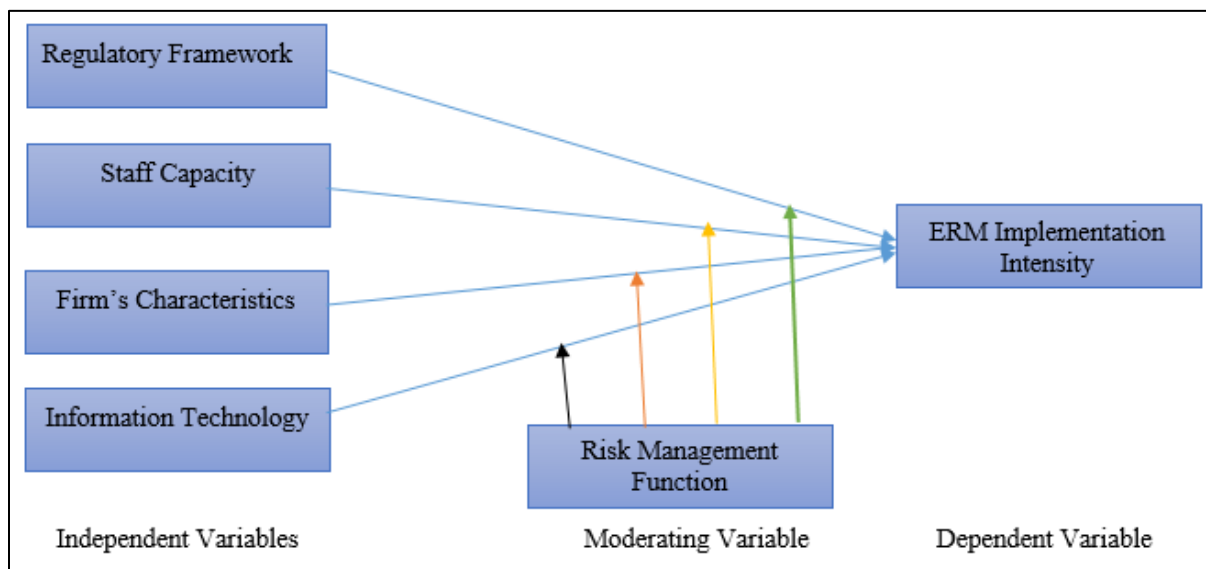
To this end, there was lacking of study carried out on how firms could understand the effects of such drivers through risk management function on ERM implementation intensity in the oil and gas sector. There seem to be increasing uncertainties that affect the well-being of oil businesses, which are attributed to risk factors such as; dwindling oil prices, unfavorable forex condition, royalty payment, pipeline hazards, terror issue and increasing risks in cyber crimes. Despite the fact that there was growing clamour for ERM, studies showed that firms' adoption and implementation of ERM remains unchanged although in some instances oil companies were characterised by loss of revenues, employee rationalization, damage of oil installations, reactionary grievances from the host communities and a lot of new operating and product regulations in the oil and gas industry in Malaysia.

Hence, this means that there could be some underlying issues that have not been addressed in earlier ERM studies. This study takes a departure from ERM effects on performance (financial and nonfinancial) and firm value of banks and insurance companies, quoted and unquoted firms, automobile companies, using multiple regression to finding out the perceived effect of ERM drivers on ERM implementation intensity in the Malaysian oil and gas industry using structural equation modeling. To better understand these assertions, the study seeks to carry out analysis of ERM drivers with the objective of determining effect on ERM implementation of the oil and gas sector in Malaysia employing the use of moderating variable. Specifically, the study aimed at determining the effects of the independent variables (Regulatory Framework - RC, Firm's Characteristics - FC, Staff Capacity - SC & Information Technology - IT) on ERM implementation intensity, and to also ascertain the moderating effect of risk management function (Chief Risk Officer - CRO) on the independent variables (RF, FC, SC & IT) and ERM implementation intensity. The outcome of the study would form a basis for ERM practice adoption across oil and gas companies in Malaysia and also would fill in on the existing knowledge gap that firms could leverage on to improve effective and efficient ERM implementation in Malaysian oil and gas industry and beyond.

Notwithstanding the lack of general acceptability of ERM, its emergence and relevance to the organization are still debatable in the business world today. ERM does not serve as a guarantee for business success; it is just a provider of consciousness about opportunities and uncertainties that if not handled well could be catastrophic to businesses. It is given the need to understand the effect of ERM drivers on its implementation intensity in oil and gas industry in Malaysia. Therefore, this paper proposes a conceptual framework for a study intended to establish the relationship among the postulated variables.

## 5.0 Conceptual Framework

This paper develops a conceptual framework that would be used for a study intended to be carried out in the future on the effects of risk management drivers on ERM implementation through the establishment of risk management office in the Malaysian oil and gas industry. The framework shows the flow and the direction of the relationship among the postulated variables of the study. Figure 5.1 below shows the conceptual model of the intended study.



**Figure 5.1 : Conceptual Model**

## **5.1 Study Variables and their Relationship**

This section of the paper highlights the linkage and the influence of the independent variables (FC, IT, RF and SC) could have on the intensity of ERM implementation in the Malaysian oil and gas industry. In the section also, the moderating effect of risk management function in the firm on the postulated variables of the study was also discussed.

Characteristics of the firm are seen as internal environment to a business and are demonstrated in terms of; organizational structure, size, ownership and management (Anderson *et al.*, 2004). In this study, these characteristics would be analysed using firm size, ownership structure, complexities, influence of key stakeholders, role of shareholders and directors in management decisions. In this situation, the hiring or forming of risk management function and the implementation of ERM as a cohesive method can also come directly from firm's board of directors (Yazid, Razali & Hussin, 2012). Equally institutional ownership with majority shares could influence decisions to adopt and implement risk management (Tahir & Razali, 2011). The complexity here means nature of the business (oil and gas), lines of business, products lines and partnerships with other companies. This could influence ERM implementation intensity, as oil and gas sectors' business is frequently associated with hazards and incidences. According to Waweru & Kisaka (2012) the size of a firm is often mirrored in the number and form of assets it owned. So, as companies own large number of assets, the larger the organization is; the more complex its operations will grow into and consequently its exposure to hostile events increases. This exposure could influence ERM effectiveness and intensity.

Information technology is normally applied in places of work such as banks, train station, hospitals, schools and business offices. It is used to improve efficiency of tasks and to keep records for future use. Information technology facilitates merging of risk management requirements and data integration from different business units within an organisation (Althonayan, Keith & Misiura, 2011). Additionally, the use of cutting-edge information technology (IT) was perceived as a main external driver (Liebenberg and Hoyt, 2003) as ERM needs much computing power (Segal, 2011). This discovery has aided firms to collect better-quality records for definite risks, model compound risks, measures risks more accurately, and improved understanding of the interdependencies across a firm operating units (Jablonski, 2001). The enhanced user-friendliness of outsourcing opportunities for innovative IT modeling activities has made ERM available to firms that are in need of specialized risk related knowledge. Nonetheless, new research evidence proposes that the implementation of ERM is slowed down by organizations' apparent lack of technological gears (Liebenberg & Hoyt, 2003). Information technology simplifies and reduces manual task skills and therefore strengthened all forms of production and explorations Lucey (2005), especially in the oil and gas industry. Some of the benefits of IT include provision of regular and consistent risk information, boost the capabilities of technology infrastructure to aid new functional requirements wanted by a business and enable a firm to carry out stress testing and enhanced risk reporting. This could facilitate in ERM implementation.

Staff capacity is the ability of staff to understand the various risks in their places of work and their effect on the operation and performance of the organisation. If the employees are aware of all the risks they would try to identify and report potential incidence. Staff capacity on ERM is mostly attained through learning and training. According to Mullins (2010), learning is a continuous process that is inevitable, acquiring skills on the business operations and environment turbulence emanating from continued changes facing business today. Once staffs have the skills, compliance to risk management culture of the firm will be smooth. Consequently, it would influence ERM implementation intensity in a firm.



Regulatory framework is dealing with rules and regulations guiding the operations or business undertakings of firms in a particular industry. These regulations are normally dosed out by regulatory agencies. They specifically spell out the dos and don'ts of operating in a particular industry or environment. According to Economic Intelligence Unit report of 2008, as put by Watt (2008), regulators, industry groups and rating agencies were putting up more pressure on firms to adopt best practice in risk management systems and processes. ERM effectiveness is achievable where rules and regulations are assimilated into ERM strategic initiatives that can offer distinct gains to firms over and above simple regulatory compliance. Manab, Othman & Kassim (2012) argued that compliance to all relevant laws and regulations is considered as one of the critical factors in adoption and effective implementation of ERM in companies.

The Malaysian regulators, such as Securities Commission and Bursa Malaysia, have obligated public listed firms to quantify their transactional risk exposure in the companies' annual reports, including that of off-balance sheet activities (Lai, 2012). Also the Malaysian Code on Corporate Governance was saddled with the responsibility of ensuring the adoption and implementation of good governance principles and best practice in structures and processes among Malaysian firms (MICPA, 2008). In terms of ERM, the code instructed all public listed companies to institute and capture in their annual report a formal risk management program framework for mitigating their business risks (Lai & Samad, 2013). These are determinations by the Malaysian regulators to safeguard the interest of investing public through regulating standards in industries, this could push firms in the oil and gas sector to implement ERM intensely. Considering the fact that the many firms still belief that ERM is another cost centres and therefore can only go for it just for compliance sake and not because of the benefits. Consequently, it would affect ERM implementation in the oil and gas sector with too much regulations and regulatory bodies across the globe.

The risk management function, usually manned by a Chief Risk Officer (CRO) or committee on risk management are responsible for communicating with the various operating units in a firm and as well reporting back to the board on risk related issues. They are the ones saddled with the power to identify, analyse, evaluate, monitor, mitigate, transfer and communicate actual and potential business risks that a firm faces. In some studies, like that of Liebenberg & Hoyt (2003), they consider intention to adopt ERM by hiring a CRO and an indication of risk management commitment by organization. Equally, Pagach & Warr (2011) considered CRO hires as a determinant for ERM adoption. Hence, the presence of CRO as proxy for ERM implementation, could aid in the application of IT in risk identification, assessment, monitoring and communication that will push the intensity of ERM implementation. Also, it could help in insuring that staff capacity is built with regards to risk management in the company. The ERM office could serve as a risk compliance unit to ensure regulatory compliance. It is generally acknowledge that the risk management function could moderate the effect of the ERM drivers on implementation intensity in the Malaysian oil and gas industry.

All the relationships and perceived effects or influence of the independent variables on the effective implementation of ERM and the intensity of such implementation could, as an end result, reduce wastage, cost, lead-time, improve productivity, quality, safety of people and the environment that lead to an improved operational excellence and by extension a gateway to firm performance (operational and financial) and ultimately, increase firm value.

## **6.0 Conclusion**

ERM has become a strategic part of most businesses, irrespective of which industry it belongs to. In the oil and gas, the risk is inherent in every single operation in upstream and downstream, even down to refining and to retailing at the filling stations. As such, this study is deemed a necessity to be engaged in one most risky industry, which is oil and gas exploration, refining and its distribution. In addition, oil and gas industry is relatively sensitive to and volatile with political, economic, social, technological, legal and environmental development, globally. This justifies linking the study of regulatory, staff capacity, organisational characteristic and information technology with ERM, with moderator of risk management. ERM implementation thus became the essentials of the industry and therefore has to be a priority of top management cluster of firms. Understanding certain factors that could contribute in the effective performance of the risk management function, could also improve its implementation intensity in the firm operation which is deemed as pertinent. It is expected that the outcome of the study could serve as major reference and guidelines, particularly for oil and gas industry, which will benchmark with other highly risky business operation.

## References

- Abdullah, N. A., Zakuan, N., Khayon, M., Ariff, M. S., Bazin, N. E. and Saman, M. Z. (2012). Adoption of enterprise risk management practices in organization: A review. *International Journal of Business & Information Technology*, vol. 2, no. 1, pp. 1-9
- Althonayan A., Keith J., and Misiura A., (May, 2011). Aligning Enterprise Management with Business Strategy and Information systems. *European, Mediterranean and Middle Eastern Conference on Information Systems*, pp.109-129.
- Anderson A., Boyle J., Brady G., Bridge M., Bromfield J., Chamblee, G. and Liebfried, K. (2004) *ERM-Integrated Framework, Application Techniques*, New York: Committee of Sponsoring Organization of Treadway Commission (COSO).
- Beasley, M. S., Pagach, D. P., and Warr, R. S. (2008). Information conveyed in Hiring Announcements of senior executives overseeing enterprise-wide risk management processes, *Journal of Accounting, Auditing & Finance* 23, pp311-332.
- Bertinetti, G. S., Cavezzali, E. and Gardenal, G. (2013).The Effect of the Enterprise Risk Management Implementation on the Firm Value of European Companies. Working Paper Series no. 10, Department of Management, Universita Ca'Foscari, Venezia.
- Boehm, B. W. (1991). Software risk management: Principles and practices. *IEEE Software*, vol. 8, pp32-41.
- Bromiley, P., McShane, M., Nair, A. and Rustambekov, E. (2015). Enterprise Risk Management: Review, Critique, and Research Directions. eScholarhip, University of California. Long Range Planning 48, 265-276
- Culp, C. L. (2008). 'The Revolution in Corporate Risk Management: a Decade of Innovations in Process and Products', *Journal of Applied Corporate Finance*, 14(4): 8-26
- Cumming, C. M., and Hirtle, B. J. (2001). The Challenges of Risk Management in Diversified Financial Companies. FRBNY Economic Policy Review / March.
- Dabari, I. J. and Saidin, S. Z. (2015). Determinants Influencing Enterprise Risk Management Implementation in the Nigerian Banking Sector. *International Journal of Asian Social Science*, 2015, 5(12): 740-754
- Egbuji, A. (1999). Risk Management of Organisational Records. *Records Management Journal*, 9 (2):93 - 116.
- EY (2012) Turning Risk into Results – How Leading Companies Use Risk Management to Fuel Better Performance. Financial Companies, *FRBNY Economic Policy Review*, March.
- Gaicuhie, C. T. (2015). Effect of Inland Petroleum Transport Risk Management Strategies on Financial Performance of Oil Marketing Companies in Kenya (thesis). Strathmore University. Retrieved from <http://suplus.strathmore.edu/handle/11071/1/4722>.
- Gordon, L. A., Loeb, M. P., & Tseng, C. Y. (2009). Enterprise Risk Management and Firm Performance: A contingency perspective. *Journal of Accounting and Public Policy*, 28(4), 301-327.
- Hoyt, R. E. and Liebenberg, A. P. (2011). The Value of Enterprise Risk Management. *The Journal of Risk and Insurance*, vol. 78, no. 4, pp. 795-822.
- Hoyt, R. E., Moore, D. L. and Liebenberg A. P. (2008). The Value of Enterprise Risk Management: Evidence from the U.S. Insurance Industry. The Society of Actuaries.
- IDC Energy Insights (2013). Reducing Risk in Oil and Gas Operations. A White Paper reprinted by EMC.
- Jablonowski, M. (2001). Thinking in Numbers. *Risk Management*, 48 (2):30-35.
- Lai F. and Samad F. (2011). Enterprise risk management and the empirical drivers of Its implementation. *010 International Conference on Business and Economics Research vol.1 IACSIT Press, Kuala Lumpur, Malaysia* 219
- Lai, F. (2012). A Review of Enterprise Risk Management Practices among Malaysian Public Listed I Companies. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering Vol:6, No:8, pp 2030-2036*.
- Lam, J. (2001). The CRO is here to stay, *Risk Management*, April, 16-20.
- Li, S. and Nadeem, M. (2010). Risk Management and Internal Control. A Case Study Of China Aviation Oil Corporation Ltd. Master's thesis in International Business 15 ECTS Department of Economics and Informatics, University West.
- Liebenberg, A. P. and Hoyt, R. E. (2003). The Drivers of Enterprise Risk Management: Evidence from the Appointment of Chief Risk Officers. *Risk Management and Insurance Review*, 6: 37–52.

- Lucey T., (2005). *Management Information Systems*. 9th ed.), Singapore,: Seng lee press
- Lukianchuk, G. (2015). The Impact of Enterprise Risk Management on Firm Performance of Small and Medium Enterprises. *European Scientific Journal* vol.11, No.13 ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431.
- Manab N. Othman S. and Kassim I. (2012). Enterprise-Wide Risk Management BestPractices: The Critical Success Factors, OIDA. *International Journal for*
- Meulbroek, L. K. (2002). Integrated Risk Management for the Firm: A Senior Manager's Guide. Retrieved 2017 [www.hbs.edu/research/facpubs/workingpapers/papers2/0102/02-046.pdf](http://www.hbs.edu/research/facpubs/workingpapers/papers2/0102/02-046.pdf)
- Miccolis, J. and Shah, S. (2000). Enterprise Risk Management: An Analytic Approach, Tillinghast – Towers Perrin.
- MICPA (The Malaysian Institute of Certified Public Accountants) (2008). Key Amendments to the Malaysian Code on Corporate Governance. [http://www.micpa.com.my/micpamember /document/](http://www.micpa.com.my/micpamember/document/).
- Miller, K. D. (1992). A Framework for Integrated Risk Management in International Business. *Journal of International Business Studies*, Vol. 23, No. 2 (2nd Qtr. 1992), pp. 311-331
- Mullins L. J (2010). *Management and Organizational Behavior*, (9th ed.). London, 221 England. Financial Times Prentice Hall.
- Pagach, D. and Warr, R. (2011). The Characteristics of Firms That Hire Chief Risk Officers. *Journal of Risk and Insurance*, 78: 185–211.
- Ping, T. A. and Muthuveloo, R. (2015). The Impact of Enterprise Risk Management on Firm Performance: Evidence from Malaysia. *Asian Social Science Journal*; Vol. 11, No. 22.
- Robert, S. K. and Anette, M. (2016). Risk Management—the Revealing Hand. Working Paper 16-102. Harvard Business School
- Rosmaini Tasmin, Josu Takala, Aliyu A. A. Bakr, Daryna Shylina, Izabela Nizialek & M.S. Che Rusuli (2016). Sustainable Competitive Advantage (SCA) Analysis of Furniture Manufacturers in Malaysia: Normalized Scaled Critical Factor Index (NSCFI) Approach. *Management and Production Engineering Review*, Vol. 7, No. 2, pp. 73-85. DOI: 10.1515/MPER-2016-0019.
- Salleh Hudin, N. and Abdul Hamid, A. (2014). Drivers to the Implementation of Risk Management Practices: A Conceptual Framework. *Journal of Advanced Management Science Vol. 2, No. 3, 163-169*
- Segal, S. (2011), Corporate Value of Enterprise Risk Management. John Wiley & Sons, Hoboken, NJ.
- Soltanizadeh, S., Abdul Rasid, S. Z., Golshan, N., Quoquab, F. and Basiruddin, R. (2014). Enterprise Risk Management Practices among Malaysian Firms. *Journal of Social and Behavioral Sciences* 164, pp332 – 337. [www.sciencedirect.com](http://www.sciencedirect.com)
- Stanton, T. H. (2012). Why Some Firms Thrive While Others Fail. Oxford University Press.
- Tahir I., and Razali, A. (2012). The relation between Enterprise Risk Management and firmvalue: Evidence from Malaysian Public listed Companies. *International Journal of Economics and Management*. 1(2), 32-41.
- Taylor, H. (2005). Congruence between risk management theory and practice in Hong Kong vendor-driven IT projects. *International Journal of Project Management*, vol. 23, pp. 437-444.
- Tummala, V. M., Leung, H. M., Mok, C. K., Burchett, J. F. and Leung, Y. H. (1997). Practices, Barriers and Benefits of using Risk Management Approaches in Selected Hong Kong Industries. *International Journal of Project Management*, vol. 15, no. 5, pp. 297-312.
- Watt C. (2008). *Enterprise Risk Information in Financial Services Organizations*. New York: Economic Intelligence Unit.
- Waweru, N. and Kisaka, E. (2012). The Effect of Enterprise Risk Management implementation on the value of companies listed in the NSE. *AAA 2012 Management Accounting Paper*, available at <http://ssrn.com/abstract=1907248>.
- Yazid, A., Razali, A. and Hussin, M. (2012). Drivers of enterprise Risk management: A proposed Framework for Malaysia public listed companies, *International Business Research*. 5(1); pp202-207.
- Yusuwan, N. M., Adnan, H., Omar, A. F. and Jusoff, H. K. (2009). Clients' perspectives of risk management practice in Malaysian construction industry. *Journal of Politics and Law*, 1(3), P121.