

THE EFFECTS OF RISK MANAGEMENT PRACTICES, RISK BEHAVIOUR
ON RESEARCH AND DEVELOPMENT
PROJECT PERFORMANCE IN UTM

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"Sufficient for me is Allah ; there is no deity except Him. On Him I have relied,"
(Surah Tawbah, 9:129)

To Almighty Allah, the Most Merciful God,
Prophet Muhammad (PBUH), the final messenger of Allah,

my lovely parents, Zainal Abidin Daud & Zalina Lim
my older brother, Amar Faiz,
my Lim's family,
soul sisters, Nur Farahin Mohd Haris & Yazmin Johari Halim Shah,
supportive friends,
(you know who you are!)
and to my cat, Comot ;

for their
endless love, encouragement, guidance, sacrifice and support through
thick and thin.

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ABSTRACT

Risk management is being measured in audit process for Research University and public universities who are awarded autonomy in Malaysia. Risk behaviour is needed to minimize and prevent risks since it influences the project performance. Unfortunately, there were lacked of discussions about the specified risk management practices and effects of risk behaviour on R&D project in Malaysia. The aim of this research is to examine the effects of risk management practices and risk behaviour on R&D project performance. Quantitative method was practiced in this study with population of 850 R&D project leaders and sample size was 265 leaders. Data were obtained from 265 project leaders of research university grant (GUP) tier 1 and 2 projects, UTM. Unexpectedly, this study revealed that risk behaviour gives higher impact on R&D project performance compared to risk management practices. Hence, risk management practices and risk behaviour for R&D projects should not be neglected since both of them affect the R&D project performance.

ABSTRAK

Pengurusan risiko diukur dalam proses audit bagi universiti penyelidikan dan universiti awam yang diberi autonomi di Malaysia. Kelakuan risiko diperlukan bagi mengurangkan dan juga mencegah risiko kerana risiko mempengaruhi prestasi projek. Malangnya, kekurangan kajian tentang amalan pengurusan risiko secara terperinci dan kesan tingkah laku risiko kepada projek R&D di Malaysia. Tujuan kajian ini adalah untuk mengkaji kesan amalan pengurusan risiko dan tingkah laku risiko kepada prestasi projek R&D. Kaedah kuantitatif telah dipraktikkan dalam kajian ini dengan populasi berjumlah 850 orang yang terdiri daripada ketua-ketua projek R&D dan saiz sampel adalah 265. Data diperolehi daripada 265 orang ketua projek yang mempunyai geran universiti penyelidikan UTM bagi tahap 1 dan 2. Adalah di luar jangkaan apabila kajian ini menunjukkan bahawa tingkah laku risiko memberi impak yang lebih besar kepada prestasi projek R&D berbanding dengan amalan pengurusan risiko. Justeru itu, amalan pengurusan risiko dan tingkah laku risiko tidak boleh diabaikan untuk projek-projek R&D kerana kedua-duanya memberi kesan kepada prestasi projek R&D.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Risk management is not something new to us. In our daily life, we do apply risk management unconsciously. For example, we choose the safest transportation to travel to minimize chances of getting into an accident, we use seatbelt to prevent of getting injury if the accident occurs, and we do check our cars fuel so that we can arrive safely to the destination that we want. In bigger context, risk management is fundamental to an organization or even country since they face challenges, obstacles and endless positive or negative possibilities that may occur. During Prophet Muhammad (PBUH)'s era, he (PBUH) agreed to stay at Medina during Trench (Khandaq) War. Their plan was to dig the trench around the city. This is because, they aimed to reduce the impact and damage to the people of Medina. As a result, they won in the trench war (Talib, 2011). Reducing the impact and damages is a part of risk management. Thus, risk management was during this war. Hubbard (2009) mentioned that formalized risk management by agreement among parties was applied in the earliest civilization. Hence, risk management has been applying in a very long time though it was not formalized and discussed like present researches.

Shafie (2011) concentrated on research and development (R&D) efficiency to society in his article. According to him, in making decision, R&D was not being used well and most of the decisions made were ad-hoc and urgent. The objective of R&D

was not 100% successful because of the implementation was not effective. The researches done were to fulfill the academic requirement for gaining university ranking rather than helping society as a whole (Shafie, 2011). Due to lack of making better decision, risk management is important in this matter. This is because of, it is included in decision making process (RIPLOVÁ, 2007). In other words, risk management will help the decision maker to make better decision.

R&D sector has been highlighted in Tenth Malaysian Plan (Unit Perancang Ekonomi, 2010) as Malaysia targets to achieve a higher income country status and developed country by year 2020. In fifth initiative of RMK-10 which is strengthen the institution and country's implementation, the government has made one step forward in education system by giving more autonomy to public universities to enhance and strengthening the culture of high performance. The autonomy, transparency and performance accountability is critical for universities in Malaysia on par with the best institutions in the world. Since public universities are heavily financed by public fund, they should be accountable for their performance. In addition, greater transparency in performance will enable the government to make improvements and provide the necessary support in R&D field. The universities are required to implement risk management and it is a part that being measure in the autonomy audit process (Universiti Malaya, 2013). As for Research University (RU), risk management is very crucial since RU has been receiving autonomy. There are five universities that have been qualified as RU which are Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Teknologi Malaysia (UTM), Universiti Kebangsaan Malaysia (UKM) and lastly is Universiti Putra Malaysia (UPM). These universities have been awarded due to their achievement that passed the measures of University Good Governance Index (UGGI) in 2011 (MoE, 2011). Hence, these universities have to maintain RU status and also autonomy. To maintain the autonomy given, risk management practices in RU is important. Lim (2011) stated that in his article, by year 2015, Ministry of Higher Education of Malaysia targets all RUs in Malaysia to receive full autonomy by year 2015. In 2012, UTM received full autonomy by the ministry. Hence it became the first Autonomy University in Malaysia (<http://www.thestar.com.my/News/Nation>

/2012/01/08/UTM-first-to-be-granted-full-autonomy/). Early 2015, there were another three public universities that have been receiving autonomy status which are Universiti Sains Islam Malaysia (USIM), Universiti Malaysia Sarawak (UNIMAS), Universiti Teknologi Mara (UiTM), Universiti Malaysia Terengganu (UMT) and Universiti Teknikal Malaysia Melaka (UTeM) (<http://www.mstar.com.my/lainlain/kampus/2015/01/16/usim-autonomi/>).

Above all, this called for this research to examine risk management practices in R&D field. The need of implementing risk management in R&D is a must to reduce risks and threats of projects that may spend a very big amount of money and time. To sum up, the importance of risk management in R&D field is crucial.

1.2 Problem Statement

The importance of applying risk management had been discussed in past researches from various types of projects (Mills, 2001; Ahmed, *et al.*, 2007). Risk management involves identifying, analyzing, evaluating, response, treatment, monitoring and communicating. It has proved that it has been implemented in various type of projects such as construction (Mills, 2001; Lee and Ali, 2012; Kululanga and Kuotcha, 2010), financial (Ashby, 2010; Sabato, 2010), business (Junior and Carvalho, 2013), accountancy (ACCA, 2012) and others. Those industries explained their risk management practices implementation for their projects. Furthermore, past researches proved the positive impact of risk management practices towards project performance (Lee and Ali, 2012; Ahlan and Arshad, 2012; Tilk, 2011; Mills, 2001). Thus, risk management practices is important in mitigate risks and reduce crises occur. Besides, it had been highlighted by Mills (2001) that by applying risk management, the decision making will be more systematic. In other words, risk management is a part of decision making process and management. In Malaysia, risk management is a part of audit process especially for RUs since they receive autonomy by the ministry (Universiti

Malaya, 2013). Therefore, the government also do see the important of risk management been implemented in institutions like public universities. However, there were lacked of past researches that discussed in details about risk management practices in R&D and also in RUs or public universities although it is important. This study examined more on the implementation of risk management practices in R&D field and also the effects of it on R&D project performance.

Managing R&D is like managing industrial innovation. It plays crucial role in all organizations and institutions. When organization takes time to invest in R&D, they get huge influx of knowledge and benefits. All risks that associated with R&D come from trying to achieve to improve quality of life. Innovation is important to all industries and it is the foundation of industry research. Thus, R&D should be taken seriously since it plays important role in development and innovation of new products and knowledge that may help the people, organization and country. In Malaysia, RM741 million was allocated to Department of Higher Education (MoE, 2011) for R&D grants schemes and RM 200.69 million had been approved for R&D projects in 2011. It was not a small amount that had been allocated by the government. Thus, the Malaysia government really supports R&D field to be develop more. In 2013, UTM approved RM 68,381,513 for 622 grants (RMC, 2014). Hence, there were big amount of money that has been allocated on R&D projects and risk management is important for organizations to prevent or reduce risks. The fourth biggest investment in America and 158-year-old firm with 25,000 employees worldwide, Lehman Brothers declared \$639 billion in assets and \$613 billion in debts. It collapsed due to the highly-leveraged, risk taking business strategies, and excessive culture of excessive risk taking (Wiggins, *et al.*, 2014). The former Chief Executive Officer, Richard Fuld mentioned that the company had 27,000 risk managers that had owned more than 30% of stock were surely dedicated and committed in handling risks. The firm declared bankrupts in September, 2008 (Onaran and Faux, 2015). Hence, the importance on implementing systematic and effective risk management is important. However, there was limitation of past studies that discussed about risk management practices in R&D project although R&D project is also a project that same like other industries' projects and has high budget.

Recent trend calls risk behaviour to be considered when examines risk management practices towards project performance. This is because, focus on risk management alone cannot determine projects' success. Behavioural management also influences the project performance. Human factors or error contributes to the failure of implementation of risk management practices and also affect project performance. This has been proved from past studies from various type of projects like construction (Mills, 2001; Kululanga and Kuotcha, 2010), financial (Ashby, 2010; Sabato, 2010), business (Stan-Maduka, 2010) and accountancy (ACCA, 2012), yet there is no solution on this matter in R&D project. Kletz (1991) emphasized that the main cause of failure was contributed by management behaviour rather than technical failure. Risk behaviour should be aligned with risk management practices so that the project will get benefits from it. To sum up, risk behaviour should not be neglected. This is because, risk behaviour of people plays its role to implement risk management practices and also to achieve success project performance. Since there were inadequate past studies that focused on risk behaviour in R&D, thus this study explored more on risk behaviour that relates to risk management practices and affect project performance.

1.3 Research Questions

- a) Does the implementation of risk management practices correlate with risk behaviour?
- b) What is the effect of implementing risk management practices to R&D project performance?
- c) Does risk behaviour affect R&D project performance?
- d) What is the combined effect of risk management practices and risk behaviour on R&D project performance?

1.4 Objectives of the Study

- a) To examine the correlation between risk behaviour and risk management practices.
- b) To examine the impact of risk management practices on R&D project performance.
- c) To examine the impact of risk behaviour on R&D project performance.
- d) To discover the combined effects of risk management practices and risk behaviour on R&D project performance.

1.5 Significance of study

Most of past researches proved that the impact of risk management on project performance in the industries rather than R&D projects. Due to limited past researches about risk management practices affect on R&D project performance, this study was constructed risk management practices that suitable to R&D field. This is to enhance the application of risk management practices effectively and effect positively to R&D project performance.

Current literatures are focusing more on process theory. Researchers mentioned in their studies that behaviour affects the risk management practices and project performance, yet there are lacked of researches on the integration of risk management and risk behaviour. Empirical evidence on how risk behaviour gave impacts to the risk management practices and project performance in R&D were provided in this study. The integration of process theory and behavioural theory would give impact on project performance in R&D context. Moreover, this study highlighted the combined effects of risk management practices and risk behaviour on R&D project performance. In a word, this study gave new development on risk management practices and risk behaviour for R&D projects.

This study contributed a great understanding for R&D field, institutions and industry as a whole to understand risk behaviour, risk management practices and project performance. Indirectly, it developed effective risk management practices and measure of risk behaviour to increase success rate of R&D project performance. Besides, new ideas and fills the gap between risk management practices and risk behaviour to achieve successful R&D projects were provided in this study. Practically, this study developed risk management practices that suitable for R&D project to gain success on project performance. Hence, this study not only explored on the implementation of risk management and identifying risk behaviour of RU's staffs, yet it gave more opportunities to the researcher to explore the effectiveness of both of them on R&D project performance.

1.6 Scope of the study

This study explored more on the implementation of risk management practices in R&D project of UTM. It focused on constructing risk management practices (risk identification, risk analysis and evaluation, risk response and treatment, risk monitoring and communication; due to suitability in R&D field). Moreover, this study discussed about risk management at a general level by identifying the risk behaviour factors that led to risk management practices and effect on project performance. By identifying risk behaviour, it gave result on correlation of risk behaviour with risk management practices and effect of risk behaviour on R&D project performance. Thus, this study examined risk management practices, risk behaviour and combined effects for both of them on R&D project performance of UTM. The R&D project performances measure were cost, time, and quality.

UTM was chosen because it is one of RUs in Malaysia that has been awarded the autonomy status from ministry (MoE, 2011). To maintain the autonomy status, UTM has to apply risk management to mitigate risks and also it is as a part of audit process.

Thus, UTM is suitable for this study that focused on R&D field. This study focused on completed projects tier 1 and 2 from 2011 until 2014 under research university grant (GUP) of UTM. The specific respondents would be all project leaders who are among UTM's lecturers that received GUP for their research studies. The population of project leaders based on data that was given by RMC, UTM was 850 project leaders. From Krejcie and Morgan (1970) formulation of sample size, this study required 265 project leaders that were selected randomly.

1.7 R&D in UTM

UTM was announced as Research University (RU) on 10th June 2010. Efforts by academician, students and staffs were pay off by this declaration. As a research university, the challenges for UTM community including academician, staffs and student is more adventurous. All parties need to be cooperate and responsible to ensure that the recognition given to be sustained. The Ministry of Higher Education (MOHE) has allocated a big amount of funds and budget for RUs to perform R&D activities, innovative and creative projects, and well-equipped environment. As stated in Facts and Figures 2013 booklet of UTM, the university approved RM 68, 381, 513 for 622 grants (RMC, 2014). Recently, the Ministry of Education mentioned that RM 3.6 billion was successfully generated through R&D activities by the RUs between year 2007 to 2013 (<http://www.bharian.com.my/node/9204>). In 2012, UTM was the first university to attain full autonomy by Ministry of Education (<http://www.thestar.com.my/News/Nation/2012/01/08/UTM-first-to-be-granted-full-autonomy/>). By being Autonomy University, UTM is fully responsible on all action taken for its institutional governance, academic governance, financial management and human resource management. Hence, as an autonomy and research university, the implementation of risk management is important for UTM since it is one of the requirements in audit.

Research alliance plays crucial role in bridging university research that stimulates innovation, collaborations and commercialization. The research alliances are;

- a) Frontier Material
- b) Resource Sustainability
- c) Healthy and Wellness
- d) Innovative Engineering and
- e) Smart Digital Community

All these five research alliance have their own role in enhancing the innovation and creativity of the R&D projects of UTM. The research alliance includes academician which is lecturers and also students to develop high impact R&D projects. Thus, UTM plays pivot role in ensure the development of R&D projects in Malaysia.

1.8 Short View on Operational Definition of the Variables

Risk management is defined as the “coordinated activities to direct and control organization with regard to risk” in ISO31000:2010. The aim of applying risk management practices is to reduce risks. To contrive risk management, risk management practices need to be applied. In this research, risk management would be explored in R&D field.

Risk management practices is the application of risk management that includes identification, assessment, and prioritization of risks followed by planning, coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of undesirable events. In this research, the proposed risk management practices were risk identification, risk analysis, risk evaluation, risk response and treatment, risk monitoring and risk communication.

Sitkin and Pablo (1992) defined risk behaviour is characterized by the degree of risk associated with decision making. It is behaviour of people when facing risk (Roherman, 2005). This study focused on risk behaviour among the project leaders, who were awarded GUP towards risk management practices and R&D project performance.

Research and development (R&D) was defined as “creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications” (OECD, 2002). This study focused on UTM since it is RU and it concentrates more on R&D research projects. Thus, project leaders that completed their research projects under GUP were targeted as respondents for this research.

The significant of R&D project performance measurement are depend on the requirement of the project to be declared as successful or vice verse from organizations’ view or aim. Merchant (1998) mentioned that the role of project performance is to help the organization to achieve and sustain their competitive advantage. This research constructed the project performance measurement that suitable to R&D field.

1.9 Chapter Summary

R&D is important since it is a backbone of the company or organization. Most of the industries already applied risk management, but as for R&D, the implementation of risk management were not discussed further. The amount of money that was allocated by the government to R&D was not a small amount. Besides, risk management alone cannot determine projects’ success. Hence, it influences the project performance. However, the negligence on R&D projects enhanced the researcher to explore more on their risk management practices, risk behaviour and also project performance. The objectives, research questions were established to further research on R&D projects for this study.

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