

RESEARCH AND DEVELOPMENT (R&D) MANAGEMENT AND ITS IMPACT
ON FIRM PERFORMANCE

AIMI NUR ATIRAH BINTI AZELAN

FACULTY OF TECHNOLOGY MANAGEMENT AND TECHNOPRENEURSHIP
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

I hereby declare that I have read this project paper and in my view this project paper is sufficient in term of scope and quality for Bachelor of Technopreneurship with Honours

Signature :

Supervisor's Name : DR. FARARISHAH BINTI ABDUL KHALID

Date :

Signature :

Evaluator's Name : MR. ALBERT FEISAL BIN ISMAIL

Date :

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AIMI NUR ATIRAH BINTI AZELAN

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Faculty of Technology Management and Technopreneurship
Universiti Teknikal Malaysia Melaka

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“I hereby declare that this project paper is the result of my independent work except the summary and excerpts that have been specifically acknowledgement”

Signature :.....

Name : AIMI NUR ATIRAH BINTI AZELAN

Date :.....

DEDICATION

To the most beautiful mother, beloved father and wonderful family in the world

Aida Shamsinar Binti Mohd Zain

Azelan Bin Noh

Aimi Nur Atiqah Binti Azelan

Amirul Nazrin Bin Azelan

Amirul Asyraf Bin Azelan

Afifah Insyirah Fitri Binti Azelan

Baserah Binti Md. Zain

Isam Binti Bidin

Last but not least to my special one.

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ABSTRAK

Pada masa kini, kejayaan Penyelidikan dan Pembangunan (R&D) pengurusan telah menjadi penting untuk meningkatkan prestasi firma. Tujuan kajian ini adalah untuk mengenal pasti peranan pengurusan R&D ke atas firma dan juga untuk mengukur kesan pengurusan R&D dalam sesebuah organisasi. Kajian terdahulu telah menunjukkan bahawa pengurusan R&D memberi impak kepada prestasi syarikat. Pemboleh ubah bersandar ialah prestasi firma dan pemboleh ubah bebas adalah strategi, budaya syarikat dan R&D iklim. Kajian ini berdasarkan pendekatan penyelidikan kuantitatif Penggunaan kaedah dalam mengumpul semua data dari data primer dan sekunder. Data primer boleh dicapai melalui soal selidik. Walau bagaimanapun, bagi data sekunder, semua data boleh didapati daripada kajian lepas sama ada dari sumber diterbitkan atau tidak diterbitkan. Pengagihan soal selidik adalah melalui e-mel dan bersemuka kepada 80 responden yang mempunyai tanggungjawab di jabatan R&D di dalam firma di seluruh Malaysia. Daripada tiga pemboleh ubah bebas (strategi, budaya syarikat dan R&D iklim) hanya dua penting untuk memberi kesan positif kepada prestasi firma iaitu strategi dan budaya syarikat. Sementara R&D iklim tidak memberi kesan kepada prestasi firma. Strategi telah menjadi pemboleh ubah yang paling penting dari segi peranannya di dalam R&D dan ia boleh memberi kesan positif kepada prestasi firma.

Keywords: Pengurusan R&D, Strategi, Kebudayaan syarikat, R & D iklim, Pencapaian firma

ABSTRACT

Nowadays, the success of Research and Development (R&D) management has become more important to *firm performance*. The purpose of this study is to identify the role of R&D management on firm and also to measure the impact of R&D management in an organization. Past studies have shown that R&D management is important to give impact on *firm performance*. The dependent variable is *firm performance* and the independent variables are *strategy*, *company culture* and *R&D climate*. The research is based on a quantitative research approach. The method use in gathering all data is from primary and secondary data. Primary data can be achieved through a questionnaire. However, for secondary data, all the data can be found from past study, either from published or unpublished sources. The distributions of the questionnaire were through e-mail and face to face to 80 respondents that have responsibilities in the R&D department inside the firms around Malaysia. From the three independent variables (*strategy*, *company culture* and *R&D climate*) only two were significant to give positive impacts on *firm performance*, which is *strategy* and *company culture*. Meanwhile *R&D climate* was found not to be significant and has no impact on *firm performance*. *Strategy* has become the most significant value in terms of its role in R&D management and it can impact *firm performance* positively.

Keywords: R&D management, Strategy, Company culture, R&D climate, Firm performance.

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LIST OF ABBREVIATION

SPSS	Statistical Package for the Social Sciences
ANOVA	Analysis of Variance
MRA	Multiple Regression Analysis
UTeM	Universiti Teknikal Malaysia Melaka
R&D	Research and Development
IV	Independent variable
DV	Dependent variable
ROA	Return on asset
ROE	Return on equity

LIST OF SYMBOL

%	Percent
p	Significant value
r	Pearson correlation coefficient
R	Multiple correlation coefficient
R-squared	Coefficient of determination

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CHAPTER 1

INTRODUCTION

1.1 Background

Today, technology has advanced at a pace to accelerate the subsequent rate of developments in all industries. On every base of any firms, comes the importance of the management systems from the very beginning. Officially there were several departments in a firm to hold different types of responsibility and task in order running the system successfully.

One major part of the firm main heart of the system is the Research and Development (R&D) department. R&D management generally understands by wide as the overall control over the activities, planning, programs, and everything that runs on the R&D department sector. In mathematics or physics, most concepts can be readily judged as useful or worthless and in management concepts, on the other hand, are more difficult to evaluate as stated by Jain, Triandis, and Weick (2010). In more significant words of it, R&D management can be also understood as the disciplines of managing the R&D, much leading the R&D department a way to be running. As Tasse, Long and Ravenscraft (1993); Vivero (2002) exerts, R&D is so important because it is a critical role in a firm's performance, productivity, and growth as cited in Ming, Hsiao, Sher and Yi (2010).

In basic, understandable general, R&D management plays a vital part of a firm, firm or an organization's performance or it seems to be so. This is because for every firm, firm or an organization of business, R&D is the future investment that holds up the firm's future lifeline. In which in that case, R&D management is the backbone of the R&D department, thus can be hugely connected as a firm's most vital and most important priority subject of the business. Due to this matter, R&D management is the sector that takes full responsibility of the entire R&D department, thus also runs the responsibility of the firm's performance in which we all can say that in general, efficient R&D management secured a firm future investment which relates each other and connected on each other heavily.

Might this relation can be seen when a firm has excellent R&D management running on their R&D department systems, which with efficient running systems, efficient programs, efficient research and etc. Jain et al. (2010) mentioned that the effective R&D management, coupled with a vigorous research and science policy, is necessary for a nation to sustain economic growth and it can have profound and far-reaching consequences

A firm definitely hold up their own future security for their own products, thus increase their performance because all of the R&D activities brought a useful information, and also useful much vital discoveries of their products As stated by Mansfield (1968) one might think that R&D would be focused mainly on new and importantly developed product innovation as cited by Hall, Lotti and Mairesse (2012).

Even though an excellent R&D management is linked to business performance, however the actual is even research and development (R&D) is not solely responsible for business performance. Furthermore, with such steps R&D is an expensive activity that never assure its potential benefits as stated by Ming et al. (2010) which was also quoted by McCutchen and Swamidass (1996)

1.2 Problem Statement

As much as R&D department exists to be the guide and mastermind behind the product development, it is crucial that originally the most important issue is from the beginning, the actual managerial system that had been implemented in the R&D department. Every firm builds their management systems in ways to get better control and better planning for the firm's progression in R&D departments near future. As much for R&D, R&D department as known existed to take the further research a brought firms' product into an advanced development, in terms of quality, service and also new ideas.

The priority of the R&D management overall is a must and one most important. When securing the aspects of doing a research and development, R&D department requires solid, systematic, efficient yet concrete, and in the order management system in order to run the activities, planning, and progress to be done. Act as the highest priority, can R&D management grips the firm's future in the market, as many can conclude that the bigger the firm is the much more solid and systematic R&D management are needed to behold and much more on the actual role of the R&D management for a firm.

This research is made by first taking the expand and deeper understanding the exact role of R&D management in a firm, what are R&D management by looking trough this purpose, this research can continue into the next phase of researching the R&D management. This research was about the impact that R&D management brought into the scene with their link up to the actual purposes of R&D management to the firm.

1.3 Research Questions

As to clear up the sentence, these are the main question that based this research.

- 1) How significant is the role of R&D management for a firm?
- 2) How does R&D management impact on firm performance?

1.4 Research Objectives

Research objectives expressed what the researcher wants to explore, describe, investigate or explain, as stated by Kent, 2007. As for this research, these are the main purpose of the study.

- 1) To identify the significant role of R&D management in firms.
- 2) To measure the impact of R&D management on firm performance.

1.5 Scope of the Study

Basically, this research is focused on measuring and analyzing the kind of impact of the R&D management going to take effect in confirming a *firm performance*.

1.6 Relevance of the Study

One of the major reasons that there is little systematic empirical investigation of the restructuring performance relationships is that the post-restructuring performance improvement has been normatively asserted. That is the direct link between R&D management and performance of a firm in research. As several theorists such constructed the resource-based theory stating that a firm's success was not wholly determined by external factors but also by its internal characteristics. As stated in Padgett and Galan (2009) it is now fevered that R&D really holds big promise of the near impact on *firm performance*, research contended that it is essential for a firm to be able to see further and beyond the common ideas and trust on the responsibility of the R&D management into a consideration of performance impact, as it will secure the long term by creating solid control of their future marketing value.

In a parallel timeline, it is said by Porter (1979) that a firm can get benefit through the use of the R&D, since R&D intensive industries usually have 'entry barriers' where companies can reach effects that were cited in Padgett et al. (2009). These effects help firms to obtain a competitive advantage over other firms. How R&D management affects a firm's productivity is a question that is of considerable interest to several researchers.

On the same curiosity of the theoretical input, the researcher has decided that in order to search and examine the impact of performance that link up of R&D management, the research must be taken as the result of the differences between the management system of the R&D department that is R&D management, and the results of firms' performance to it.

CHAPTER 2

LITERATURE REVIEW

In this chapter, the literatures of the R&D management impacts on a *firm performance* have been discussed. Throughout this chapter, an introduction about R&D, R&D management, R&D management approach and *firm performance* are discussed and the conclusions of this discussion are stated in the conclusion.

2.1 Introduction

Many empirical studies have tried to determine the importance of various factors which underlie the productivity residual in which investment in R&D has been one of these factors. Ming et al. (2010) stated that to sustain the competitive advantage of the firm, R&D is always considered as a very critical part of a firm. Krishnan, Tadepalli, and Park (2009) also supports the statement by stating that to be one of the competitive advantage firm in this era of global competition, outsourcing, and information technology is to emphasize both R&D and marketing investments in organizations. R&D is important to a firm or a company due to its capability of delivering competition with other companies on and off the field.

In several results, many had been proven that R&D are related to the firms' performance, which is believed that positive impact are keen to appear when relates to R&D. Ming et al. (2010) stated based on a past research that has studied, the relationship between R&D and *firm performance*, the positive impact on *firm performance* due to R&D but also stated that even R&D had its positive impact, there are no where sure that it is a potential reward as the R&D activity is too costly.

As the matters go on, it is true that a positive R&D management done great impact on the R&D efficiency thus improving a firm performance. This is the reason for why many companies are taking such high precaution and awareness of doing their R&D management system as if running into the wrong situations or time, it would be greatly cost the firm which is can severely damage the stability of a firm.

2.2 Firm's Performance

On every corner of the business fields, *firm performances* are the most important aspect to fight for. There is a basic hypothesis of the *firm performance* that has good business come from the good performance of a firm. Hence there are also cases that are not, basically firm performance holds the main key of firm success.

In general, *firm performances* are about the quality of the firm's sale rates, profitability, and efficiency in business. Gathered the factors of the performance, it is likely that each and every factor there are highly connected to R&D. Pioneered by Ming et al. (2010) they found that *firm performance* can be measure using return on asset (ROA), return on equity (ROE) and net profit growth rate. Sung, Bell and Xiaohong (2008) also stated that *firm performance* can be measured by using financial based which are ROE, ROA, and use five-year net sales growth as a measure of a firm's growth. This research used financial-based, there are ROA, ROE and net profit growth rate to measure the performance of the firm.

2.3 R&D Management

Basically, R&D management existed as a system to gain control of the R&D department with their planning, goals, research and for every single activity that runs in the department. It is believed that there is an impact that R&D management has their own spot on a firm's performance. Stated by Van Atta, Lippitz, Bovey, Dubin, and Blazek (2011) the impacts of the R&D are all about the form the R&D activities themselves. Much more also been stated by Jain et al. (2010) that in order to maintain and sustain economic growth, was needed essential view for a nation, company or a firm to have impressive management and the corporation with the researches and science policy. As in this chapter, the literature on the R&D management have been studied, examined, and analyzed using R&D management *strategy*, *company culture* and *R&D climate* as the core independent variable and using a firm's performance as the dependent variable.

Every firm has their own R&D department hence having their own R&D management system. Efficient management is the vital needs of the R&D department, by many firms are taking their future R&D results from having an efficient management system running through the department. There are variables from past studies that are shown in Table 2.1. From Table 2.1, R&D management can divided into several scopes of management and that are:

- 1) Strategy
- 2) Company culture
- 3) R&D climate