

**THE MODERATING EFFECT OF CORPORATE GOVERNANCE
CHARACTERISTICS ON THE RELATIONSHIP BETWEEN INNOVATION AND
FIRM PERFORMANCE: A STUDY ON MALAYSIAN PUBLIC LISTED
COMPANIES**

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ABSTRAK

Kajian ini adalah bertujuan untuk mengenalpasti jenis dan kepentingan kesan urus takbir korporat ke atas hubungan di antara perbelanjaan penyelidikan dan pembangunan (R&D) bagi tahun 2005 dan pencapaian firma yang diukur dengan keuntungan atas ekuiti (Return on Equity) dan keuntungan atas aset (Return on Asset) bagi tahun-tahun 2005, 2006 dan 2007. Analisa dijalankan ke atas syarikat yang tersenarai di pasaran Mesdaq, papan utama dan padan kedua Bursa Malaysia bagi tahun 2005. Keputusan bagi hubungan terus menunjukkan perbelanjaan R&D mempunyai hubungan negatif dengan nilai purata ROE dan ROA. Ini mungkin disebabkan oleh perbelanjaan R&D yang besar mengakibatkan keuntungan firma menjadi lebih rendah. Berkenaan dengan ciri-ciri urus tadbir korporat, keputusan menunjukkan hanya kekerapan mesyuarat ahli lembaga pengarah menunjukkan hubungan negatif dengan nilai purata ROE. Ini mungkin disebabkan oleh mesyuarat-mesyuarat yang tidak efektif. Dengan menggunakan teknik “moderated regression analysis”, didapati interaksi di antara perbelanjaan R&D dan pampasan kepada pengarah menunjukkan kesan positif ke atas hubungan di antara perbelanjaan R&D dan dengan nilai purata ROE dan ROA. Ini mungkin disebabkan pampasan memotivasi dan menggalakan pengarah untuk meningkatkan pencapaian firma. Tambahan lagi, interaksi di antara perbelanjaan R&D dan frekuensi mesyuarat juga menunjukkan kesan positif. Ini mungkin disebabkan pengarah mempunyai lebih banyak masa untuk berbincang mengenai pelaksanaan projek R&D. Rumusannya, para pelabur perlu menganalisa ciri-ciri urus takbir korporat apabila menilai pelaburan R&D yang dibuat oleh firma. Ini dapat membantu pelabur dalam mengenalpasti samada pelaburan R&D itu memberi kesan positif ke atas pencapaian firma.

ABSTRACT

This study investigates the nature and significance of the moderating effects of firm's board governance on the relationship between innovation (R&D) expenditure for year 2005 and firm future performance measured by average Return on Equity (ROE) and Return on Assets (ROA) for year 2005 to 2007. A cross-sectional analysis of firms listed in the Mesdaq, main and second board of Bursa Malaysia for the year 2005 is utilized. Result from the direct effect reveals that R&D expenditures have significant negative effects on the average ROE and ROA. The reasonable explanation is that it could be due to the huge R&D expenditures cause the return for the year to be inferior. In respect of corporate governance characteristics, only the frequency of board meetings has a significant negative relationship with ROE. The negative relationship may be due to the ineffectiveness of the meetings. Furthermore, using moderated regression analyses, the interaction effect of R&D expenditures with board compensation provide significant positive effect. This could be due to compensation is a major source of motivation and encouragement for the directors to improve firm performance. Furthermore, the interaction of board meeting and R&D expenditures also show significant positive effect on the relationship between R&D expenditures and firm performance. The reasonable explanation is that directors will have more time spend on discussing the R&D projects' progress and difficulties. In conclusion, it can be proposed that investors should take into account the corporate government characteristics such board compensation and frequency of board meetings when evaluating the R&D investment made by the firms. This will help to determine whether such as R&D investment would be able to generate positive contribution toward firm future performance.

CHAPTER 1

INTRODUCTION

This chapter discusses the background of the study concerning the moderating effect of corporate governance on the relationship between innovation expenditures and firm performance. It gives an introduction to the study that discusses the background of the study, research objectives, research question and the contribution of the study to the society.

1.1 Background of the Study

Agency theory explains the relationship between the principal who is the owner of the economic resources and the agent who is the controller and manager of the resources (Jensen & Meckling, 1976). In addition, agency theory was developed based on the assumption that the agents have more information than the principals, which caused difficulty to the principals in monitoring the agents effectively (Adams, 1994). Due to the advantage of having more information on the economic resources, the agents tend to maximize their self-interest rather than the owners' wealth (Scapen, 1985). In this connection, corporate governance has been applied by most of organization as a set of mechanisms to influence the decisions made by agents when there is a separation of ownership and control. By having good corporate governance practices, managerial opportunism can be reduced. One of the areas where managerial opportunism can occur is innovation investment described as Research & Development (R&D). This is because the managers may manipulate R&D investment when there is a conflict of interest between the principals (shareholders) and the agents (managers) of the firms. For instance, shareholders may be interested to see that the organization rigorously involves in R&D activities in order to ensure that the firm performance in future

will be improved. However, lack of experiences and time spent in the R&D activities may cause managers to spend the financial resources inefficiently and ineffectively by having unproductive costly meetings. Besides, R&D is one of the significant areas within any corporate entity as could determine the future performance of the firms. Wang and Chang (2005) mention that previous studies have found that R&D expenditures are not only influence current performance and market value but also future performance.

In relation R&D expenditures in Malaysian market, based on the survey conducted by Ministry of Science, Technology and Innovation Malaysia, the Research and Development (R&D) expenditure has been steadily and consistently grow since 1996. In relation to private sectors which are the major contributor toward R&D activities in Malaysia, the expenditure has increased by RM400.5 million, from RM1.63 billion in 2002 to RM2.03 billion in 2004. This phenomenon indicates that more and more companies put a greater emphasis on R&D activities. However, the impact of the R&D investment on the firms' performance has yet to conclude.

1.2 Problem Statement

Innovation is one of the important aspects for company growth particularly for technology-based firms. Prior studies find that innovation expenditures are relatively significant in determining firm performance particularly in technological based industry (Chauvin & Hirschey, 1993; Chen,Cheng & Hwang, 2005). As such, innovation can be viewed as one of the most powerful competitive weapons in the business operations (Wang & Chang, 2005). Generally, day-to-day business operations are handled by a group of management team appointed by the shareholders of the firm. Management team is expected to

maximize the shareholder wealth in making business decisions such as innovation expenditures. However, due to divergent goals and risk preferences, the management team tends to maximize their compensation rather than the shareholders' wealth (Jensen and Meckling, 1976; Eisenhardt, 1989). Consequently, the firm performance could be adversely affected such as the collapse of Enron in US and Marconi in UK (Khanchel, 2007). Following from these phenomena, increasing attention are given in relation to monitoring the management team by the shareholders through corporate governance mechanism. Previous studies have identified the corporate governance mechanism which will help in ensuring the management team make strategic business decisions such as innovation expenditures that will maximize shareholders' wealth (Walsh & Steward, 1990 and Shleifer & Vishnu, 1997). As such, the application of corporate governance could potentially affect the relationship between, innovation expenditures and firm performance. As mentioned by Le, Walters and Kroll (2006) previous studies in relation to corporate governance mechanism have empirically proven that the relationship between R&D expenditure and firm performance can be influenced by managerial opportunism. (Zahra, 1996; Sanders & Carpenter, 2003; Tihanyi et al, 2003;). The existence of managerial opportunism due to divergent goals and risk preferences between the managers and owners of the firm whereby managers run the firm in a way that will maximize their benefits rather than the owners' value (Jensen & Meckling, 1976; Eisenhardt, 1989). One of ways that managerial opportunism can be practiced is through R&D expenditures since it plays an increasing role in business nowadays (Chen, Cheng & Hwang, 2005). One of the examples for managerial opportunism is that the management team engaging inexperienced R&D consultants based on the personal relationship rather than their capabilities. By imposing corporate governance mechanism, it will help to ensure that managers will to make decisions in relation to R&D expenditures that

will maximize shareholder values (Walsh & Steward, 1990; Shleifer & Vishny, 1997). In this connection, this study is conducted to examine the moderating impact of the corporate governance mechanism on the relationship between R&D expenditures and firm performance.

1.3 Research Objectives

The objectives of the research are stated as follows:-:-

- 1) to examine the relationship between R&D expenditures and firm performance in Malaysia;
- 2) to assess the relationship between corporate governance practices and firm performance in Malaysia; and
- 3) to investigate the moderating effect of corporate governance practices on the relationship between R&D expenditures and firm performance.

1.4 Research Question

Subsequent to the above research objectives, the following research questions are necessary to be addressed:-

- 1) Does R&D expenditures affect firm future performance?
- 2) Does corporate governance practice have an impact on firm performance?
- 3) Does corporate governance practice affect the relationship between R&D expenditures and organizational performance?

1.5 Significance of the Study

The findings of the study may contribute the knowledge to the financial literatures particularly for investors to apply in making investment decision. The following is the significance of the study:-

- 1) Provide information on the potential impact of R&D expenditures on the firm performance which will assist investors in making decision on strategic investments;
- 2) Provide information in relation to the effectiveness corporate governance mechanism that will help investors to predict future firm performance; and
- 3) Provide information to the firms' shareholders in relation to corporate governance practices which will assist them prevent managerial opportunism;
- 4) Provide information to the investors in relation to effectiveness of corporate governance practices in relation to firms R&D investment.

1.6 Organization of the Study

The study is divided into five sections and the outline of the remaining chapters is as follows:-

Chapter 2: Literature Review

This chapter presents the review of the related literature in relation to the theories and empirical evidence pertaining to corporate governance, R&D expenditures and the effect of corporate governance, R&D expenditures on firm performance. The discussion on the corporate governance is focused on corporate governance characteristics such board size,

board meeting, independent directors and CEO duality. In addition, the theoretical framework as well as hypotheses development is also discussed in this chapter.

Chapter 3: Research Methodology

The chapter provides discussion on research methodology and the model used in the study. This chapter outlines the sample used in the study, the measurement of the variables applied in the study and also the statistical techniques used in examining the moderating effect of corporate governance on the relationship between R&D expenditure and firm performance.

Chapter 4: Results and Data Analysis

The chapter outlines the descriptive statistics along with results for regression analysis. The result from the SPSS are summarized and tabled comprehensive format. The interpretation of the results are discussed and justified by comparing with the previous studies. Finally, the results are summarized by using the hypotheses developed in the study.

Chapter 5: Conclusion

The final chapter presented the key empirical findings and compares the findings for the different models used in the study and the implications of such findings. In addition, it also explains the limitation of the study. Based on the current study, the recommendation for future research is also suggested in this chapter. The section is the conclusion of the study.

CHAPTER 2

LITERATURE REVIEW

This chapter presents the review of the related literature in relation to the relevant theory and empirical evidence pertaining to corporate governance, innovation and firm performance. The first section explains the essence of agency theory and prior studies in relation principal-agent relationship. The second section discussed the concept of corporate governance and the corporate governance mechanism such as board size, board meeting, independent directors, CEO duality and compensation. The third section highlights the meaning of innovation and factors for successful innovation. The fourth section discusses on the instruments in measuring firm performance. The final section discusses on the relationship between corporate governance, innovation and firm performance. The review of the above leads to the construction of the theoretical framework for this study.

2.1 Agency Theory

Berle and Means' (1932) Principal-Agent model underpins the philosophy of the modern theory of the firm and many models of corporate governance. The agency theory evolved from the problem arises from the separation of ownership and control whereby the controllers of the economics resources pursue their own aims and serve their own interest at the expense of owners of the resources (Berle & Means, 1932). As such, the main elements of agency theory are the principal and agent in which the principal is the owner of the economics resources who authorizes the agent to manage and control their economic resources in the manner that will maximize their wealth. According to Jensen and Mechling (1976), in order to solve principal-agent relationship problem, agency cost will be incurred. Basically there are

two major problems in respect to principal-agent relationship. Firstly, it is difficult or expensive for the principals to verify what the agents are doing. Secondly, principals and agents prefer different actions due to different attitudes toward risks (Eisenhardt, 1989, p. 58). As explained by Adams (1994), The agent, will have full knowledge in relation to the economics resources and the authority in utilizing the resources. Due to the knowledge possessed by the agent, information transfer process is one of major aspects in the principal-agent relationship which could lead to information asymmetry problem (Arrow, 1962). Quinn and Doherty (2000) explain that the asymmetry problem is due to the agents who have detailed knowledge on the operation as they are controlling the daily operations. On the other hand, the principals may not have the knowledge on the operations or may not be able to interpret the information in the perfect manner. Quinn and Doherty (2000) further explain that the information asymmetry is not a problematic issue in the principal-agent relationship. The issue arises when the principals and agents pursuing different goals in relation to the economics resources. The incongruent goals may lead the agent to utilize the information in the manner that will detriment the principals.

Furthermore, Ardalan (2007) highlights that there are three sources of conflict of the interest between the managers (agents) and the owners (principals). The first source of conflict of interest is when the manager interested to remain in power even when the owners have not required them to remain in the position. The second source of conflict is in relation to the difference in the investment policy. For example, shareholder usually holds a diversified portfolio so that a relatively small portion of his wealth is invested in any company to minimize the risks. However, the manager may prefer majority of the capital tied up in the firm. Therefore, if the project fails, a manager will lose more than a shareholder. Due to differences in investment policy, the shareholder and the manager caught into conflict of

interests. The final source of conflict is in respect of the availability of excess cash flow whereby the owners prefer that cash to be distributed to them. On the other hand, the managers may either retain the cash flow or invest it in negative NPV projects. In addition, Downes and Russ (2005) states that in certain cases, agents act unethically by taking advantage of the information asymmetry and use their position to pursue their personal agendas rather than the principals. These agents are capable to hide and distort information in the manner that will appear as pursuing in the best interest of the principals. They propose that as a measure to reduce the incidences and agents misbehavior, the principals should establish a governance mechanism that will foresee and monitor the agents' action in their daily operation activities. By having effective corporate governance, it will minimize the agency problem by promoting the agents interest in the firms (Jensen & Meckling, 1976).

2.2 Corporate Governance

Corporate governance refers to a mechanism which outlines the set of rules and procedures in managing the relationship between shareholders, company management, Board of Directors, controlling shareholders, minority shareholders and other stakeholders. The main objective is to ensure that the management of the organization behaves in the best interest of the owner of the organization[Report on the Observance of Standards and Codes (ROSC) 2005]. As Fama (1983) points out, corporate governance helps to promote organization performance and economic growth through specialization of investment and management. Shleifer and Vishny (1997) view corporate governance as a method on ensuring the capital investment made by the owner of the organization are appropriately compensated. According to Gillan and Starks (1998), corporate governance is a system of laws, rules and factors that

control operation of organizations. Based on the above definitions, it can be concluded corporate governance is a mechanism that can be used by the owner of the organization to ensure the manager of the organization operates the organization in the way that will increase the owner's wealth. Since the owner of the organization has different objectives as compared to owner of other organizations, the implementation of corporate governance is different from one another.

In relation to corporate governance in Malaysia, the establishment of Finance Committee on Corporate Governance in 1998 has led to the issuance of Malaysian Code on Corporate Governance (MCCG) to provide guidelines on the principles, direction for the implementation as well as the best practices of the corporate governance. Currently, besides MCCG by Finance Committee on Corporate Governance, Capital Market Master Plan (CMP) by Securities Commission and Financial Sector Master Plan (FSMP) by Bank Negara Malaysia are also the main sources of the corporate governance practices in Malaysia. In addition, the establishment of institutional development such as Malaysian Institute of Corporate Governance (MICG) and the Minority Shareholders Watchdog Group (MSWG) further assist in developing the awareness and practice of good corporate governance in Malaysia. The Finance Committee on Corporate Governance (2000) has applied the following definition of corporate governance in Malaysia:-

“ Process & structure used to direct & manage business & affairs of the company towards enhancing business prosperity & corporate accountability with ultimate objective of realizing long term shareholder value, whilst taking into account the interests of other stakeholders”

Based on the above, the committee views that corporate governance is not just considering shareholder but also stakeholders' interests.

However, in 2007, the Malaysian Code on Corporate Governance (Revised 2007) has been released to replace the existing regulations issued in March 2000. The main objective is to strengthen Malaysia's corporate governance framework and improvise it as per current global best practice. Basically, the revisions strengthen the roles and responsibilities of Boards of Directors and Audit Committees and aim to ensure the effective performance of roles. The revisions also specify the eligibility criteria for the appointment of Directors, the composition of the Boards and the role of the Nomination Committee. Based on the new regulations, Independent non-Executive Directors should continue to make up at least one-third of the members of the Board and that there should be a more meaningful and independent oversight function. Nomination Committee should appoint in relation to the appointments and reappointments of the Board. Nomination Committee is expected to evaluate the professionalism and integrity of each Director. The Committee should also make sure that Board members possess basic skills, knowledge, expertise and experience to perform their roles and responsibilities. In addition, the revised Code strengthens the regulations on the role of Audit Committees to ensure that they carry out an effective audit on firm's managers. The new rules cover the composition of Audit Committees, the frequency of meetings and the need for audit committee members to attend continuous training to keep abreast with developments in relevant financial and other related developments. Executive Directors are excluded from membership in order to ensure the independence of the Audit Committee. Furthermore, the following discussions will focus on the widely used governance mechanisms in academic researches.

2.2.1 Corporate Governance Mechanism

According to Ardalan (2007), corporate governance mechanism might reduce the agency effect and generally, there are four broad categories of corporate governance mechanism as follows:-

1) Legal and regulatory mechanisms

This category emphasizes on the system of laws and regulations that govern the firm. In making decision on ownership structure, capital markets, financing, and dividend policies by the managers, the shareholders will be protected by this system of laws and regulations.

2) Internal control mechanisms

This category focuses on the board of director structure, compensation plan, the firm's ownership structure and the firm's debt structure. The components of this category are constructed on the basis that it will pursue shareholder interest.

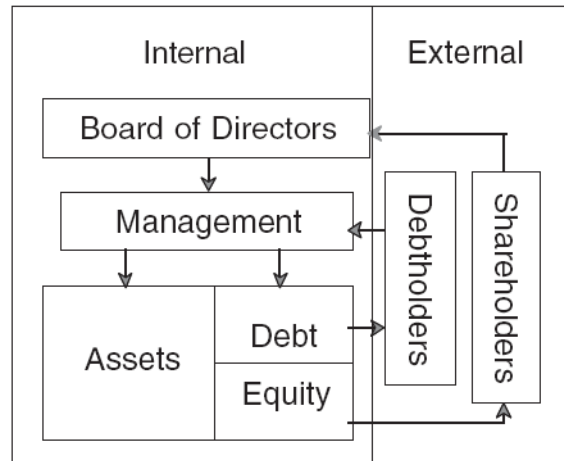
3) External control mechanisms

Under this category, the managers are given the threat of losing control if the case where their management has deviated from pursuing the shareholder interest.

4) Product market competition

The poor product market performance will demonstrate inefficiency of the management. As such, the shareholders will be to evaluate whether the decisions made by the managers are based on their interest.

On different perspectives, according to Gillan (2006), corporate governance mechanism falls into two groups, namely, those internal to the firm and those external to the firm. These two groups can be illustrated by the following Figure 1-1:-



Source: Ross, Westerfield & Jaffe, 2005

Figure 1-1. Balance sheet model

The above balance sheet model indicates two groups of corporate governance mechanism whereby the left-hand side shows the components for internal governance and the right-hand side shows the components for the external governance. In respect of the internal governance, the board of directors is responsible for advising and monitoring management team who is given the authority to manage the firm (Jensen, 1993). On the right hand side is the elements for the external governance arising from the firm's need to raise capital. The separation between those who provide the capital and those who utilize the capital lead to the demand for corporate governance mechanism.

In this connection, the current studies focus on the internal corporate governance mechanism, namely board size, number of board meetings, number of independence directors, CEO duality and board compensation. According to Gillan (2006), board size, number of board meetings, CEO duality and number of independence directors are categorized as

structure of board of directors. On the other hand, board compensation is categorized as managerial incentives.

2.3 Innovation

Innovation has been viewed in different dimension in the previous studies. According to Lall (1992), innovation capability refers to the ability to enhance existing technology for producing new product through effective utilization and improvement of existing skills and knowledge. In addition, innovation has been defined as an outcome of a product commercialization after gone through an orderly process of design, development and completion or refinement (MacPherson, 1997). Syhu and Chiu (2002) refine MacPherson (1997)'s definition of innovation into a broader scope whereby innovation is consisting of series of activities in the areas of science, technology, organization, finance and commerce.

Meanwhile, Wadhwa, Bhoon and Chan (2006) regard innovation as evident by successful commercialization of a product. However, Huang and Lin (2006) comment that successful commercialization of product relies on the marketing efforts conducted by the marketing teams. As such, innovation should be measured up to the point where a marketable product is successfully produced. Based the above studies, it can be summarized that innovation expenses should be measured up to the point where the product is successfully generated and available for commercialization.

According to Feldman and Martin (2004), the study of innovation and economic growth began in earnest in the late 1950s with the work of Robert Solow (1959) who has empirically demonstrated that technological change was the major factor for economic growth in the American economy during the 1909 to 1949. Feldman and Martin (2004) explain that

economic growth is resulted from the ability to extract greater economic value through science and technology.

According to Panne, Beers and Kleinknecht (2003), the successful innovation based on the following factors: -

1) Firm related factors

Firm related factors could be classified into four factors which are discussed as follows:-

a) Firm culture

A culture susceptible to innovation plays important for the firm to engage in the innovation activities (Lester, 1998). By encouraging innovation initiatives by the firms will help to demonstrate the significance of innovation to the firms. Johnne and Snelson states firm's cultural susceptibility can be further strengthen by having mission statement which emphasizes on the value of product development to the firm.

b) Experience with innovation

Firm previous experiences in the engagement of innovation projects would create a conducive environment for future innovation activities (Stuart & Abetti, 1987). This is true since the experiences will improve the innovation skills. According to Zirger (1997), learning-by-doing and learning-by-failing effects are two crucial phenomena in the product learning cycle. The experiences in both phenomena will help the firm to improve the efficiency and identify the weaknesses in the innovation activities.

c) Characteristics of R&D team

According to Panne, Beers and Kleinknecht (2003), firm's R&D capabilities are affected by several characteristics of R&D teams. One of the characteristics is the team's configuration which project's viability can be improved by having interdisciplinary (Roure & Keeley, 1990).

Another significant characteristic is attendance of a product champion (Panne, Beers and Kleinknecht, 2003). By having an individual acting as innovation-dedicated internal entrepreneur within the R&D team, there will more chances for successful innovation (Link, 1987). The champion would be able to confront with internal resistance to innovation. In addition, the product champion will be acting as efficient technology gatekeeper in relation to the firm's scientific information (Rothwell, 1992).

(d) Firm strategy towards innovation

According to Lester (1998), articulated innovation strategy is crucial for firm innovation activities since it provides a guidelines in dealing with strategic issues such as market selection and skills required for development. In addition, the advantage of synergy between similar projects can be achieved by having strategically planned projects (Rothwell, 1992). Besides, Rothwell (1992) also states that skills acquired through learning-by-doing can be applied to the future projects through proper plans. Another study by Cottam *et al.* (2001) finds that providing strategic direction to the innovation activities, the benefits of previous studies can be utilized in the future innovation activities.

2) Project related factors;

Project related factors could be categorized into two aspects which are discussed as follows:-

a) Complementary

According to Maidique & Zirger (1984), firm's resources such as management and market research skills, sales, distribution, R&D and production facilities will determine the prospect of the firm's innovation efforts. Previous studies find that synergy between R&D and marketing capabilities are crucial for innovation success. Cooper, 1983 and Link, 1987). In addition, synergy can be maximized by focusing on innovation within the product group customers are already familiar with (Hopkins,1981).

b) Innovation management style

Cozijnsen *et al.* (2000) finds that 60% of the innovation project's viability is determined by adequate time management, cost, information and decision-making. Crawford (1991, p.27) suggests that by splitting the project by constituent phases, the project can be more manageable. Whin and Wahajan (1998) states that failure of projects could be due to skipping of phases. According to Panne, Beers and Kleinknecht (2003), there two significant phases in the innovation projects, namely, planning and evaluation. During the planning phases, uncertainties are clarified into clear tasks and responsibilities (Maidique & Zirger, 1985). While during evaluation phases, the viability of innovation projects can be identified (Mansfield & Wagner, 1975).

3) Product related factors

Mansfield & Wagner, 1975 stated that price and products are two significant factors in relation to a product. They add that consumer satisfaction determinants such as quality, relative price, total-costs-of-use, convenience-of-use, after-sales services, and backward compatibility are significant in order to determine innovation success.

4) Market related factors.

According to Hopkins, 1981 competitive advantage can be achieved by through early introduction of products into the market. As such, Wind & Mahajan (1988) recommends that innovation process should be expedited in order for the product can be introduced earlier to the market. However, Hultink (1998) suggests that the quality of the products should also be emphasized during early introduction of the products.

In relation innovation (R&D) expenditures in Malaysian market, based on the survey conducted by Ministry of Science, Technology and Innovation Malaysia, the Research and Development (R&D) expenditure has been steadily and consistently grow since 1996. In

respect of private sectors which are the major contributor toward R&D activities in Malaysia, the expenditure has increased by RM400.5 million, from RM1.63 billion in 2002 to RM2.03 billion in 2004. In addition, other factors related to R&D activities such as human capital have also increased. The headcount of R&D personnel and researchers have increased tremendously which was approximately 70% and 80% respectively. The results of the survey are shown in the following Table 2-1. In this connection, it can be summarized that R&D activities have gained significant attention among the firms in the private sectors. As such, R&D could be one of the areas that potentially provide significant positive impact on firm performance in the future.

Table 2-1
R&D in Private Sector

R&D IN THE PRIVATE SECTOR		
<u>R&D Expenditure</u>	<u>2004</u>	<u>2002</u>
Total Expenditure	RM2,033.6M	RM1,633.1M
Current Expenditure	RM1,599.1M	RM932.7M
- Labour Cost	RM578.5M	RM248.9M
- Operating Cost	RM1,020.6M	RM683.8M
Capital Expenditure	RM434.5M	RM700.3M
<u>Human Resources in R&D</u>	<u>2004</u>	<u>2002</u>
Headcount of R&D Personnel	8,737	5,177
Headcount of Researches	5,940	3,349
Headcount of Technicians & Support Staff	2,797	1,828

2.4 Firm Performance

Basically, firm performance can be categorized into market returns and accounting returns. Both measurements have their own advantages and disadvantages. It has been argued that accounting return is a more relevant measure of firm performance since it is a product of the governance process (Sloan, 2001). However, accounting based performance measures do not capture all consequences of agency conflict (Azim and Shailer, 2003). As such, it may not be conclusive. On the other hand, market performance measures are considered more robust on the basis that they are not subjected to any management manipulation. However, it is argued that market performance measures are not efficient measures due to uncontrollable factors such as economic downturn (Dalton et al, 1999). Due to these arguments, various types of measurement for firm performance have been applied in the previous studies. Chen, Cheng and Hwang (2005) uses market-to-book value ratio and Return on Equity (ROE) as the measure of firm performance in their study in respect of the relationship between intellectual capital and firm's market value and financial performance. In addition, Wang and Chang (2005) in their study on intellectual capital and performance measure firm performance used both ROA and ROE as part of other performance variables. Furthermore, lagged 3-year average total shareholder return has been used as measure of firm performance by Le, Walters and Kroll (2006) in their study on the moderating effect of external monitors on the relationship between R&D spending and firm performance. In earlier study conducted by Vafeas and Theodorou (1998), firm performance is measured by equity capitalization plus total liabilities, all divided by total assets. In the recent study conducted by Cheng (2008), ROA is also used as one of the measures for firm performance.

Following from the above discussion on firm performance, the current study measures firm performance by referring to Return on Equity (ROE) and Return on Assets (ROA) as these measures are closely related to corporate governance mechanism (Dilova-Kirkowa, 1999). The next section will discuss on prior empirical studies in relation to innovation, corporate governance and firm performance.

2.5 Innovation, Corporate Governance and Firm Performance

This section will review the empirical studies on the relationship between innovation, corporate governance and firm performance.

2.5.1 *Innovation (R&D) Expenditure and Firm Performance*

Earlier studies content that R&D investment is one of the significant factors for firms to stay competitive, particularly in the high-tech industry (Chan, Martin & Kensinger, 1990). Li, Zhao and Liu (2006) comment that firm innovation is the basis of economic development and the necessary path for firm development. This is because employee's productivity and efficiency can be improved through innovation (Dougherty and Hardy, 1996; Lawless and Anderson, 1996). As such, technological innovation can improve firm performance (Dougherty and Hardy, 1996; Li and Deng, 1999). In this connection, Huang and Lin (2006) also comments that previous studies find that there is a significant and positive correlation between research and development (R&D) expenditures and business performance as well as market value (Cockburn and Griliches, 1988; Hall, 1993; Chauvin and Hirschey, 1993).

In the study conducted by Huang and Lin (2006), they find that there is positive relationship between R&D ratio and firm performance in the next period. This result is also consistent with earlier finding by Deeds (2001) who concludes that R&D intensity, the late period technology development capability, and technology absorption capability have a positive correlation with market value added.

This finding also supports previous study by Chauvin and Hirschey (1993) who concluded that R&D expenditures have consistently significant, positive influences on the market value whereby higher R&D expenditures attract higher expectation of future cash flow by the investors. In addition, Lev and Sougiannis (1996) also found that there is a significant inter-temporal association between firms' R&D capital and subsequent stock returns. They suggest that this could be due to either systematic mispricing of the shares of R&D-intensive companies, or compensation for an extra-market risk factor associated with R&D. Another study performed by Shera and Yang (2005) shows that the improvement in the firm performance was resulted from higher the R&D intensity and higher R&D manpower. This indicates that there is positive relationship between R&D capabilities and firm performance. Their study consistent with the study conducted by Hitt et al (1997) who conclude that rapid technical change and increasing global competition have encourage firm to improve its ability to develop innovative new products and services as this will influence on long-term performance.

Furthermore, Cozzarin (2006) finds that firm with higher innovation expenditures tend to have a higher market share, labor productivity and price-cost margin. The result of the survey conducted is shown in the following Table 2-2.

However, in another study conducted by Chen, Cheng and Hwang (2005), they find that there is significant negative relationship between R&D expenditures ROE. They explain

that this could be due to R&D expenditure reduce the firms' net income which lead to inferior financial performance. This could be the reason for Le et al (2006) measures firm performance in relation to the effect of R&D spending by taking lagged 3-year average total shareholder returns. In other words, the impact of R&D activities on firm performance may not be immediate. Instead there should be certain range of time period for the effect to be reflected on the firm performance. This could be true since the acceptance of new product by the market may require a great deal of promotion activities.

Table 2-2
Innovation performance survey

Variable	Innovation novelty			
	World	Canada	Firm	Non-innovator
(Mean of performance variable)				
Market share	0.42%	0.30%	0.19%	0.17%
Labour productivity	109,728	98,422	83,033	86.841
Price-cost margin	26.6%	25.2%	23.4%	22.9%
Relative labour productivity	128.15%	114.35%	102.48%	106.56%
Relative price-cost margin	108.79%	106.22%	98.2%	95.99%

2.5.2 Innovation (R&D) Expenditure and Board Size on Firm Performance.

Board size refers to the number of directors appointed to represent the overall shareholders in monitoring and supervising the management team. Previous studies suggest that in order for larger group to reach consensus it will require more efforts and subsequent decision are more compromise and less extreme as compared to smaller group (Kogan and Wallach, 1966; Moscovici and Zavalloni, 1969; Sah and Stiglitz, 1986, 1991). Khanchel (2007) concludes that previous studies find that the size of the board has significant impact on

the quality of corporate governance. Cheng (2008) finds that the board size may affect the performance variability through its effect on R&D spending. This is due to the facts that firms with larger board size tend to be less likely involved with high-risk projects such as R&D activities. She added that for less-risk capital investment, board size is not a matter.

However, Hermalin and Weisbach (2003) find that smaller board size are more effective as compared to the larger board size due to free rider and monitoring problems. This finding is consistent with the earlier finding by Yermack (1996) where there is a negative relationship between board size and firm value due to the larger board size tends to experience communication and coordination problems.

In Malaysia, MCCG recommends that decision on the board size should be based on requirement for board effectiveness. As such, there is no specified number of the board has been suggested. Nevertheless, the firms are encouraged to ensure that there is active participation and effective decision making process.

2.5.3 Innovation (R&D) Expenditure and Board Independence (Outside Director) on Firm Performance.

Board independence refers to the composition of outside directors in the board of directors. The proportion of outside directors can be measured by the ratio of outside directors to the board size.

Based on the study conducted by Chung, Wright and Kedia (2002) to examine on how the corporate governance structure affects market valuation capital R&D investments, they find that there is a significant and positive relationship between R&D investments and the firm value but only for firms with higher proportion of outside directors. This finding is supported by Adam and Mehran (2003) who conclude that firm performance can be improved by improving

the proportion of outside directors since they are more effective in monitoring manager performance.

On the other hand, the R&D investments do not have significant impact of the firm value for the firms with smaller proportion of outside directors (Coles et al, 2007). Based on the findings, they suggest that the existence of outside directors in the board tend to better discipline managerial behavior. These finding consistent with the previous study by Fama and Jensen (1983) who conclude that by having higher fraction of independent outside directors, the managers activities and decision making will be more effectively monitored. Belden et al (2005) also confirm that outside directors are better monitors.

In Malaysia, Bursa Malaysia listing requirements amendments released January 2001 require at least one third of the board to comprise independent directors. The term independent as prescribed by the listing requirement and the Malaysian Governance Code refers to independence from management and independence from the significant shareholders.

2.5.4 Innovation (R&D) Expenditure and Number of Board Meeting on Firm

Performance

Generally, the main function of board of directors meeting is to engage face-to-face discussion in respect of firm performance.

It has been suggested that the time spent on board meeting is important aspect in improving the effectiveness of the board (Coger et al, 1998). According to Shivdasani and Zenner (2004), where there is requirement for tight control and supervision, the board should be ready to increase the number of meetings frequency. Based on these findings, it can said that number of meeting will encourage the board of directors to discuss on the firm