

**MALAYSIAN MESDAQ VENTURE CAPITAL FIRMS:  
SIGNALING VARIABLES OF FIRM VALUE**

**by**

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## **DEDICATION**

**To :**

**My wife, Norazalina bt Ab Wahab**

**and**

**my children**

**Yasmeen, Amirul, Syameel, Azdee and Alya**

**For your understanding and supports.**

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## ABSTRAK

Tujuan kajian empirik ini dijalankan adalah untuk mengkaji faktor-faktor yang boleh memberi isyarat dalam menentukan prestasi sesebuah syarikat dengan menggunakan data bagi 37 buah firma yang tersenarai dalam bursa saham MESDAQ. Data yang digunakan untuk tujuan kajian ini diekstrak dari prospektus syarikat yang diterbitkan untuk paparan umum sebelum tawaran awam permulaan (Initial public offering - IPO). Pembolehubah-pembolehubah berkenyataan yang dipilih sebagai pembolehubah-pembolehubah tidak bersandar adalah, bilangan paten, bilangan ahli di bahagian penyelidikan dan pembangunan, bilangan sekutu, pendapatan tahunan, nisbah hutang terhadap ekuiti, nisbah aliran wang masuk tunai terhadap jualan, tahap terkurang harga “underpricing”, minat pemilik, firma biayaan modal teroka/ firma bukan biayaan modal teroka, dan firma teknologi maklumat/firma bukan teknologi maklumat. Pembolehubah bersandar yang digunakan untuk mengukur nilai firma adalah permodalan pasaran. Analisis regresi univariat dan regresi berganda digunakan untuk menerangkan hubungan diantara pembolehubah-pembolehubah. Hasil kajian regresi univariat menunjukkan bahawa tahap terkurang harga dan pendapatan tahunan adalah berhubung secara positif dengan nilai firma, manakala, hasil kajian regresi berganda menunjukkan bahawa tahap terkurang harga, pendapatan tahunan dan jumlah paten adalah berhubung secara positif dengan nilai firma. Implikasi terhadap hasil kajian ini adalah firma-firma harus meletakkan tahap terkurang harga yang rendah apabila memasuki pasaran awam, memastikan pendapatan tahunan yang agak tinggi dan berinovasi serta mempatenkan produk yang dicipta.

## **ABSTRACT**

This empirical research investigates eleven factors or variables that provide signaling power of the firm's performance using data of 37 firms listed on Malaysian MESDAQ market.

The data used for the purpose of this study are extracted from the companies' prospectuses prior to initial public offering (IPO). The explanatory variables chosen as the independent variables are number of patents, number of R&D members, number of alliances, annual revenue, debt-equity ratio, cash inflow-sales ratio, profit margin, underpricing, owner's interest, Venture Capital/non-Venture Capital, and Information Technology/non-Information Technology. The dependent variable to measure firm value is the market capitalization.

A univariate and multiple regressions analysis were used to explain the relationship of the variables. The univariate regression results showed that underpricing and annual revenue are positively related to the firm's value. While the multiple regression analysis indicates that level of underpricing, annual revenue and number of patents are positively related to firm's value. The implications of this finding are that firms should underprice the issue price when going public, ensure high relative stream of revenues and be aggressive in innovation and to get the product patented.

## **Chapter 1**

### **INTRODUCTION**

#### **1.1 Introduction**

This chapter starts with the background of venture capital (VC) and the importance of VC as a subject for research focus area. It then describes research problem statements and research questions. Next, this chapter mentions definition of key terms, then highlights significance of the study and organization of the study.

#### **1.2 Background**

The role of venture capital (VC) in providing funding as well as expertise to start-up firms have received a prominent position in the study of financial markets in recent years. The focus of VC investments is on the high growth and high technology start-ups due to the fact that these types of innovative firms offer the opportunity of reaping up high return on investments. In the study of the impact of venture capital on technological innovations, Kortum and Lerner (2000) examined the patenting patterns across industries over a three-decade period and suggested that the effect is positive and significant. In earlier studies by Tyebjee and Bruno (1984), Gorman and Sahlman (1989), and Sahlman (1988, 1990), and later studies by Hellmann and Puri (2002) and Lerner (1995) all document significant value creation by VCs. The U.S venture capital industry has been considered as the “model” of venture capital system in which it represents two-thirds of the world’s total.

Governments around the world have been eager to duplicate the success of the fast-growing U.S venture capital industry. The reason being, the venture capital has spurred innovation in the U.S, and maybe could be duplicated elsewhere (see, for example, European Commission (1995)). There have been many studies that have

attempted to analytically explain the relationships between VC investments and the firms' performances. Not surprisingly, the relationship between the venture capitalists and investors gives rise to agency problems because investors commits large amounts of money for long-term, but these potentially non-transparent investment in private ownerships firms may not allow them to exercise control without forfeiting their limited liability.

To overcome this problem, studies have look at specific signaling models (Allen and Faulhaber (1989), Leyland and Pyle (1977), Welch (1989), and Titman and Trueman (1986)) to reduce these agency problem. Two approaches employed by previous researches in investigating the signals or factors that reflect firms' performance. The first approach was by issuing questionnaires to the VC firms asking specific criteria used by VCs in the selection processes. Fried and Hisrich (1994), in examining the activities of 18 venture capitalists in the USA, found that venture capitalists obtain a large amount of information through a detailed screening and evaluation process before undertaking the investment which helps to reduce the adverse selection problems as suggested by Amit, Glosten and Muller (1990).

Another approach was by evaluating the firms' performance at initial public offering (IPO). Even though IPOs are always characterized by the presence of high information asymmetry between issuers and investors but a firm wishing to go public must prepare a prospectus to inform investors about their past performance and future prospects before the offering. Thus by looking at the prospectuses, the profile of VC or VC-backed companies could be obtained. Even though investigations about the company were carried out at the time of the IPO, the prospectus contains wealth of information about the history of the company dating way back, in many cases, to the founding of the company. Several previous researches that look at IPO performance of VC firms are: Wang, Chua and Megginson (2001), investigate the signaling power of

technological and financial variables in venture capital by referring to 236 high tech IPOs of the U.S Nasdaq market listed firms and Bygrave, Johnstone, Matchett, and Roedel (2001) examined 117 Nasdaq listed companies in investigating the relationship between management team, market/industry, technological and financial factors against the firm performance.

Based on the review of the literature, this study attempts to consolidate the variables that act as signals to the firms' performance of the Malaysian MESDAQ market, which is a new stock exchange for high growth technology stocks. Instead of looking into the U.S market, this study is focused on the Malaysian market perspective. Pandey (1997) noted that the venture capital evaluation in Asia is different from that of the U.S in his analysis of development of VC firms in Asia. Thus, one of the reason for studying the MESDAQ listed firms is to provide for a generalized VC model for Malaysia. At the same time, it is noted that no study has yet been carried out to test the VC model in the Malaysian perspective by special reference to the IPO performance.

Also, lately the globalization of business and internalization of the economy has resulted in greater interest in VC. The Malaysian government, for example, has emphasized on the need to strengthen the VC activities due to the weakening of manufacturing sector, which face severe labor cost competition from other cheap labor cost countries. Thus, by focussing more on VC activities, the high technology industries could be enhanced through greater R&D expenditures.

### **1.3 Problem Statement**

Venture capital investments are high-risk businesses because of lack of information and information asymmetry that exists between VCs and the owners. Thus, VC investors need to have a reliable signal in order to understand the companies' future prospect. There are a few researches that pointed out the variables, which have significant

relationships with the company performance, for example, in analyzing firm performance using traditional (financial) and technological factors, Wang, et. al (2001) found that traditional factors dominate the signaling process. On the other hand, Ayuso, Campos, and Molina (2000) had carried out study on Spanish stock market companies by relating performance to intangible assets and result revealed that performance is associated with quality of human resources. While Bygrave et. al (2001) had examined several factors of management team, market, technology, and financial criteria and found that the performance is related to R&D expenses, management quality, sale revenue, sale revenue growth and industry stage.

In analyzing the characteristics of Asian venture capital industry, Pandey (1997) pointed out that the evaluation criteria used by VCFs in U.S. is different from in Asia. For example, in U.S, VC focus a lot more on the qualitative factors, particularly the characteristics of the entrepreneur, while in Asia, the evaluations vary from country to country. Singapore, Japan, India and Thailand focus on entrepreneur's personality and experience and less focus on financial considerations. On the other hand, Sri Lanka and Taiwan put considerable focus on financial considerations.

Since investing into start-up firms involve high risk, venture capitalists have to know and understand the companies well in terms of the strengths of their management team, employee, market/industry prospects, financial and technological growth factors before venturing into their businesses so that the risks could be minimized and high return on investment could be achieved. Thus it is very important to investigate and find out what are the characteristics of the good performing firms.



## **1.4 Research Objectives**

In view of the importance of venture capital investment activities in promoting and enhancing businesses of high growth and technology firms, it is the motivation of this research to find out the characteristics of good performance firms. At the same time, a review of small business literature in Malaysia suggests that very few empirical researches had attempted to explore the characteristics of successful firms that win the interest of venture capitalists to the point of exiting as a listed firm.

For the purpose of this research, the analysis will be carried on Malaysian companies that are listed on MESDAQ, which forms the exit point for Malaysian high growth companies. The information about the company's present and past performances will be drawn from the IPO prospectuses. It is hope that the findings of this study could be used by the venture capitalists in making judgments in their selection process as well as by the entrepreneurs in preparing themselves to be the chosen recipients for the venture capitalists.

In relation to the previous research findings on the characteristics of the VC funded firms in the US, Europe and Asia, it is the objectives of this study as well to test the performance models in Malaysian VC context. Looking into the Malaysian VC activities, MESDAQ is chosen as contender for this study since it is the market for high-growth and high technology firms and it is also a market that was designed to provide exit route for VC. The study seeks to investigate the firm performance, measured by market capitalization, by looking at the performance of the firms at initial public offering (IPO). Based on the literature review, eleven variables are identified to be investigated in this study. Those variables suggested are basically from four different categories; technological (number of patents, number of R&D personnel, number of alliances), financial (profit margin, annual revenue, debt-equity ratio, cash in

flow-sales ratio), traditional (level of underpricing, owner's interest), and type of firm (VC firm, IT firm).

### **1.5 Research Questions**

This research is specifically trying to get answers for the above problems by addressing the following questions;

1. What is the relationship between market capitalization and number of patents?
2. What is the relationship between market capitalization and number of R&D members?
3. What is the relationship between market capitalization and number of alliances?
4. What is the relationship between market capitalization and annual revenue?
5. What is the relationship between market capitalization and debt-equity ratio?
6. What is the relationship between market capitalization and cash inflow-sales ratio?
7. What is the relationship between market capitalization and profit margin?
8. What is the relationship between market capitalization and under pricing?
9. What is the relationship between market capitalization and owner's interest?
10. What is the relationship between market capitalization and VC financed/non VC financed firms?
11. What is the relationship between market capitalization and IT /non-IT firms?

### **1.6 Abbreviation of key terms**

VC : Venture Capital

R&D : Research and Development

MSC : Multimedia Super corridor

MESDAQ : Malaysian Exchange of Securities Sealing & Automated Quotation

IPO : Initial Public Offering

## **1.7 Significance of the Study**

In general, the study attempts to test the generalizability of the VC model developed by previous researches by using Malaysian data. The outcome of this study could nourish the VC model and thus more accurate prediction could be made in assessing the firms' performance.

At the same time this research is expected to provide guidelines to the potential firms seeking VC funds in presenting and emphasizing the significant factors in their prospectus. To the investors, it would provide a guide to select the right company to invest during an IPO. This will, as a result, encourage the growth and listing of small and medium sized companies as well as promote Malaysia's MSC and k-economy towards growth of Malaysian Capital Market.

For the venture capitalist, the significant factors as in the prospectus would be a signal of future prospect of the high growth firms.

## **1.8 Organization of the Study**

The thesis is divided into five sections. Introduction is provided in the first chapter, where in this section, a brief introduction about venture capital, and importance of the study are presented. The second chapter explains the Malaysian VC industry and literature on venture capital relating to factors for performance of the firms. Chapter three presents the theoretical framework, statement of hypotheses, and research methodology. In chapter four, data analysis and results relating to theoretical hypotheses are described. The discussion and conclusions are presented towards the end of this study, in chapter five.

## **Chapter 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

There are several areas of research deemed important to the development of this study. This chapter reviews those relevant literatures by providing the definitions of VC concepts, and the rise of capital based finance. The second section reviews the Malaysian VC industry, the Malaysian capital market master plan (CMPP), and initial public offering (IPO). Then, reviews of relevant literatures and findings of the previous studies are presented in section three. The last section proceeds with theoretical framework and statement of hypotheses.

#### **2.2 Venture Capital (VC) Definition and Concepts.**

Venture capital (VC) is a type of capital that is related to the financing of enterprises that are attempting to do something innovative, new and untested. Megginson (2002) defined VC as “a professionally managed pool of money raised for the sole purpose of making actively-managed direct equity investments in rapidly-growing private companies and with a well defined exit strategy”.

For new enterprises or start-up firms, the main problem faced is to meet large cash flow needs to cover for fixed costs of installing infrastructure or product development before demand and revenues materialized. Attracting capital is difficult for these firms because of their high level of uncertainty, lack of tangible assets (for collateral) and high level of information asymmetry between entrepreneurs and investors. Realizing the fact that most successful companies begin with an

entrepreneur, a technology and an idea, venture capitalists will finance these high risk, potentially high return firms by purchasing equity while they are still privately held as well as channel their dedicated expertise to these newly established companies. As a result, venture capital has evolved into an important financial intermediary in today's financial markets.

Venture capital form of financing differs from standard bank finance in three main areas. First, venture capitalists use their high level of expertise to perform technological monitoring and to actively manage the companies they finance. They provide funding as well as their extensive experience with early stage companies and contribute their expertise to the founding team and provide access to the network of management talent, engineers and service providers. Second, the capital infusions in the firms financed by venture capital are staged in several rounds. Those stages are: Seed/Angel Round, Start-up/Early stage, Expansion/Development, Mezzanine/Bridge, Buyout/Restructuring and Others (Pre-IPO, Privatization). Third, venture capitalists usually have control rights (e.g. board rights, voting rights). On the other hand, banks form of financing is different, where banks traditionally perform accounting monitoring without technological monitoring and their control is limited to assets as collateral. Real value of VC is actually in nurturing and not just as source of funding.

On a global level the venture capital industry has recently experienced considerable growth over the recent past. Spreading out from the US, venture capital has become a major financial intermediary for the start-ups and fast growing firms especially in high-technology industry sectors.

An analysis of the universe of all venture capital-financed companies over the period 1970-2000, DRI-WEFA ([www.nvca.com](http://www.nvca.com)) said that venture capital-backed companies had approximately twice the sales, paid almost three times the federal

taxes, generated almost twice the exports, and invested almost three times as much in R&D as the average non-venture capital-backed public company, per each US\$1,000 of assets. The study also showed that in addition to its role of developing the high technology sector, venture capital financing was also responsible for innovation across other industries of the U.S economy, such as biotechnology, consumer products, retailing, construction, transportation, industrial, financial services and forestry.

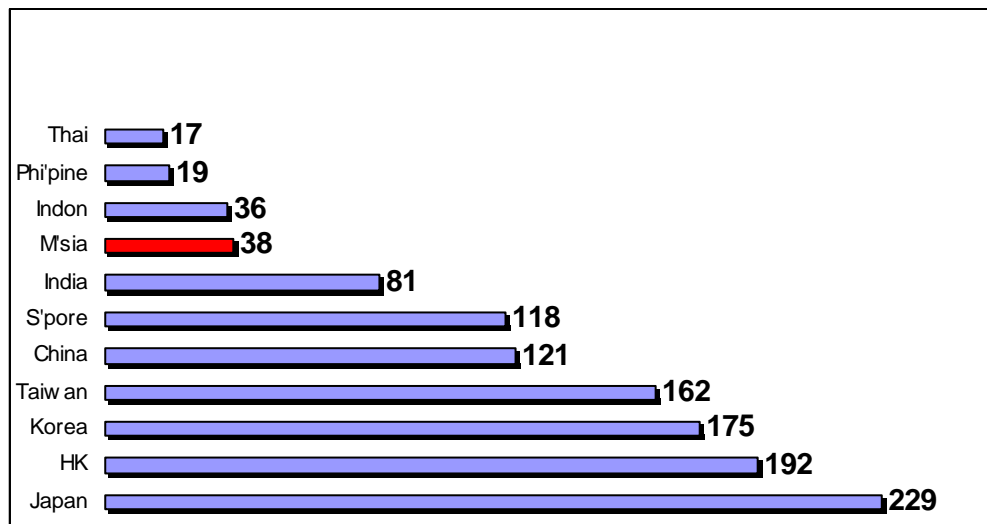
The more prominent examples of successful venture-financed firms of the 1980s and 1990s are: Compaq, Netscape Communications, Apple Computer, Network General, Cisco Systems, Yahoo!, and eBay ( Horvath, 2001). These companies are at the frontier of innovations where numerous types of new products and services were introduced thus enriching today's global economy. A recent survey also found that 95% of European venture capital-backed companies would not exist or would have developed more slowly without VC investment ([www.euroventure.com](http://www.euroventure.com)).

The important role of venture capital firms in providing financing for start-up companies has spread to many countries in continental Europe and Asia.

## 2.3 Malaysian Venture Capital Industry

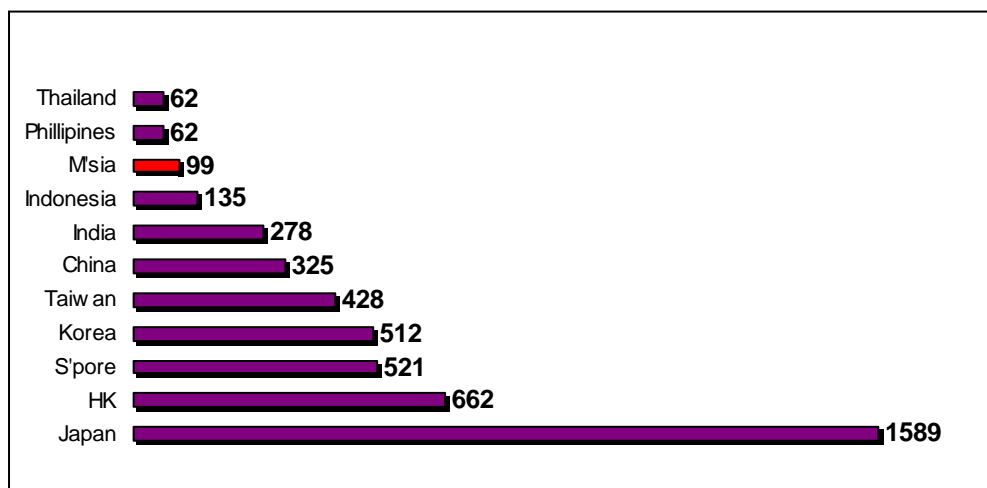
### 2.3.1 Venture Capital in Malaysia

Compared to developed countries, Malaysian VC industry is still relatively small. Figure 2.1 and 2.2 below describe the number of VC companies and the estimated number of VC professionals in Malaysia as compared with that of other Asian countries.



Source: Asian Venture Capital Journal (AVCJ)

Figure 2.1. Number of Venture Capital Companies (2000)



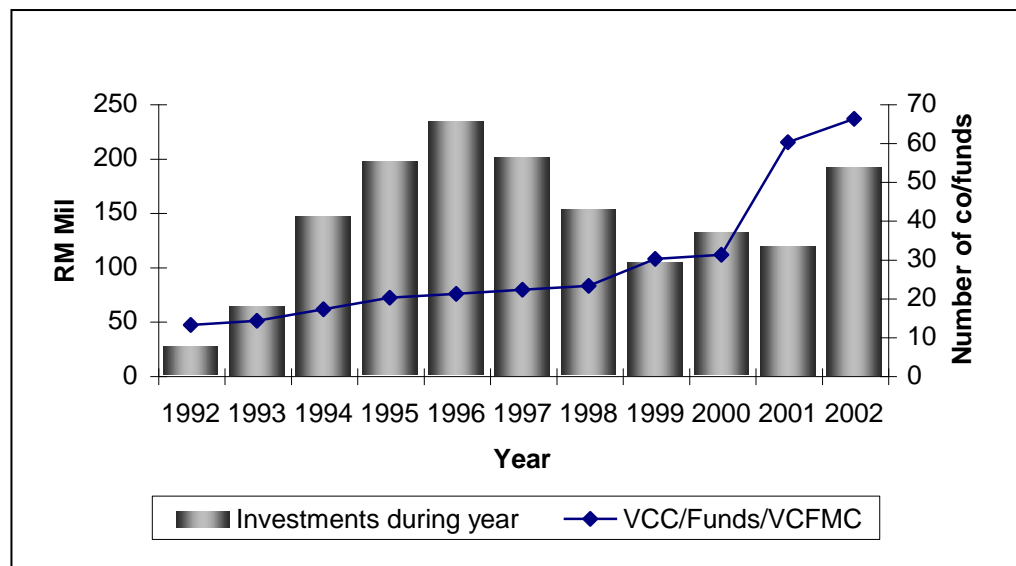
Source: Asian Venture Capital Journal (AVCJ)

Figure 2.2. Estimated Venture Capital Professionals (2000)

Referring to the above figures (Figure 2.1 and Figure 2.2), Malaysia has the least number of VCs and VC professionals after Thailand and Philippines. Japan has 16 more times of VC professionals compared to Malaysia, while Singapore's number is 5 times higher.

This indicates that Malaysian VC industry has yet to be regarded as important financial intermediary in financial capital market or there is the possibility that the venture capitalists are still trying to find the right firm to venture in and has yet to find clear signals parameters to rely on.

Figure 2.3 below presents the Malaysian VC investment amount from 1992 to 2002 and number of companies per fund.



Source: Bank Negara Malaysia Annual Report 2002

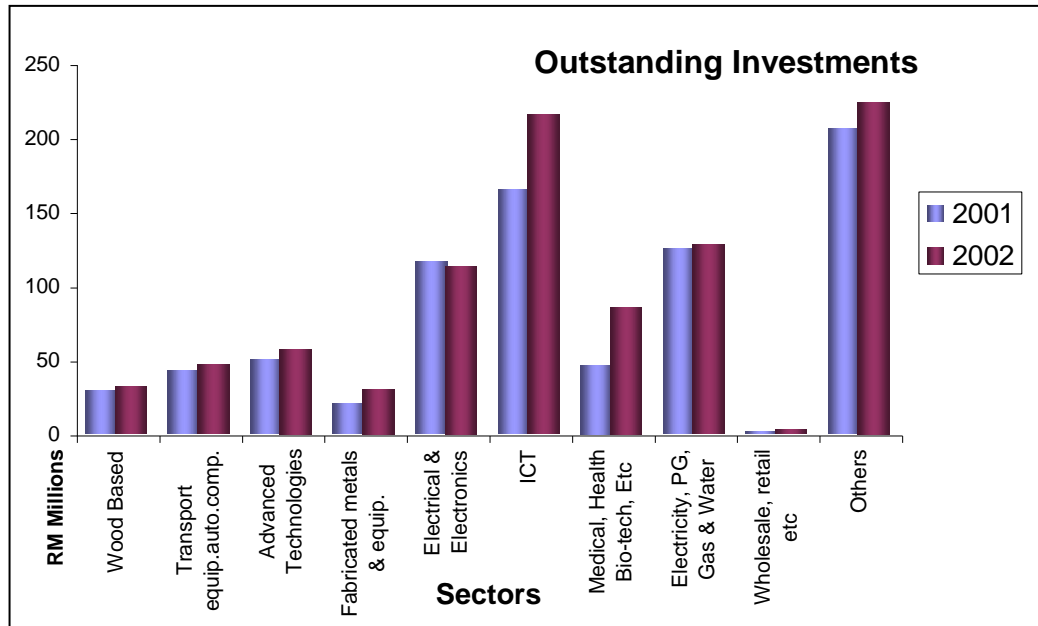
Figure 2.3. Progress of Malaysian Venture Capital Industry

The investment amount increased steadily from 1992 until 1996, basically due to the emergence of dotcom companies, but the trend reversed during Asia currency crisis in 1999. After the year 2000, the number of companies per fund increased



drastically, indicating the investment amount rendered has reduced but the number of funding companies increased.

In order to understand which sector received the most VC fund, figure 2.4 below describes the outstanding investments for the respective sectors.



Source: Bank Negara Malaysia Annual Report 2002

Figure 2.4. Venture Capital Investments According to Sectors (2002)

The sector that received the highest VC investment in 2001 and 2002 was IT and the amount increased in 2002. This is followed by electronics sectors, however the investment amount for electronics declined slowly from 2001 to 2002.

Table 2.1

*Key Statistics of Venture Capital Industry*

<b>Key statistics of Venture Capital Industry</b>			
	As at end 2001	As at end 2002	% change
Venture capital funds(RM million)	2497.7	2536	1.53
Total Investment (RM million)	968.5	1112.4	14.85
Number of venture capital / companies funds	41	46	12.00
Number of venture capital fund / management companies	19	20	5.26
Number. of investee companies	235	297	26.38
	During 2001	During 2002	
Total Investment (RM million)	118.7	191.4	61.2
No. of investee companies	47	80	70.2

*Source: Bank Negara Malaysia Annual Report 2002*

The performance of VC industry in Malaysia has slightly improved in 2002 as compared to 2001. The total investment amount, number of venture capital funds and number of investee companies increased more than 10%, however, the venture capital funds increased only 1.53%.

### *2.3.2 Capital Market Master Plan (CMMP )*

Recognizing that new sources of funding through venture capital are essential to funding the development of new businesses of the new economy, the government has included in its Capital Market Master Plan, the strategies to increase the venture capital investment into the local firms. Among the strategies implemented are:

1. Establishment of the Venture Capital Consultative Council (VCCC) to centrally coordinate the promotion and development of the venture capital industry.
2. Venture capital companies are given exempt dealer status under the Security Industry (Exempt dealer)(No. 2) Order 2002 gazetted and come into force on 1 Aug 2002.
3. Review of tax framework by the Security Commission (SC) for the venture capital industry in collaboration with the tax authorities, industry participants and the central coordinating agency for the industry.
4. The increase of joint investment programs between government and private sector venture capitalists to boost private sector participation in disbursing government funds for seed and start-up capital, allowing greater foreign participation in the VC industry.

The role of VCCC encompasses: act as government advisory panel on venture capital, act as government problem solving body, collect opinions from the various interested parties and coordinate the decided solutions across the various government bodies, provide vision, direction and assistance in the overall development plan for the venture capital industry, review and devise policy, make and pursue recommendations based on government guidelines and provide a conducive environment for the industry participants, in general the venture capital industry.

#### *2.3.4 The MESDAQ Market.*

The government has setup the Malaysian Exchange of Securities Dealing & Automated Quotation (MESDAQ) on March 18, 2002, to provide for an exit route to

the venture capitalists as a means of liquidating their equities. While entry standards imposed for a full listing on traditional stock markets may be too rigorous for young technology based companies, the new *stock markets for high growth, and innovative companies* (MESDAQ) offers different listing requirements that are aimed at different types of issues. A listing can be obtained more cheaply and easily than on traditional stock markets and without the need for a long trading record. Generally, there are fewer restrictions on the size and the length of operating records of the companies that join the market.

The MESDAQ market caters to the technology and high growth niche segment companies. However, many of MESDAQ companies are also in businesses that have limited precedence and thus whose market potential cannot be easily determined. These businesses are instead driven by idea, processes or intellectual property criteria that do not offer investors residual should the businesses fail. However, there is the potential of reaping high rewards out of this high-risk investment activity, should the business succeed.

This study seeks to explore the significant signaling powers of high tech and high growth firms listed on MESDAQ because this is the primary exit point for the Malaysian VC firms.

As of 28<sup>th</sup> of January 2003, there are 37 companies listed in the MESDAQ market. Out of these 37, 27 are were classified as VC financed firms. They were classified as VC financed firms due to one of their shareholders were indicated in the prospectus as VC or they were financed by another firm which plays key role in the management team.

The distribution of the market by industrial sector are as in figure 2.5

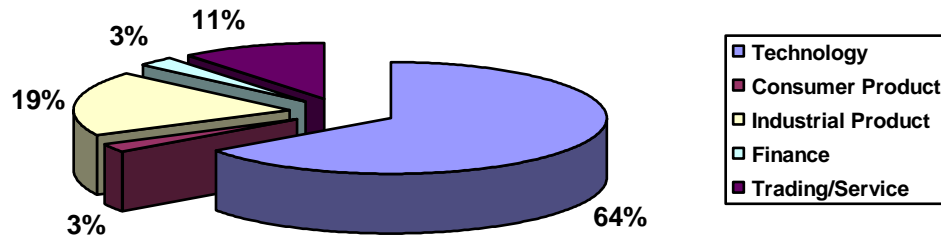


Figure 2.5. MESDAQ Industrial Sectors

### 2.3.5 Initial Public Offering (IPO)

One of the exit route strategies for the venture capitalist is to realize their liquidities through IPO. Venture capitalists aim of an IPO is not only to realize high returns but also to build up a reputation for superior venture selection and assistance. Through the IPO, the relationships between firm value at the time of IPO and the firm's previous performance and forecasted figures could be drawn. In the many studies of the IPO, the typical assumptions is that the IPO is the first point where we can observe how the market values the shares of the firm going public. However, the IPO may not be having the correct signals because of the presence of information asymmetry between issuers and investors.

As a general rule for firms wishing to go public, they have to publish prospectus for the public to draw on as much information about the company so as to reduce this information asymmetry problems as well as agency problem. By examining the IPO prospectuses, the investor could obtain information about the history of the company and its management dating back to the founding of the company.

## **2.4 Venture Capital (VC) Literature Review**

In making decisions on new opportunities, an evaluation of the idea, the technology, the markets and the people are required. The most appropriate approach is to have direct discussion with the entrepreneurs, and the management team in order to understand the motivation, goals and capabilities, and to develop a greater understanding of the technologies, markets and products under consideration.

In evaluating the impact of innovation activity, Hellman and Puri (1999) found that firms pursuing an innovator strategy (defined as companies aiming to be the first in their markets) are more likely to get venture capital financing and are quicker to do so than those pursuing an imitator strategy (those with a product that has existing competition). They also found that among all innovator companies, those with venture capital financing were faster to market. Further, they have also statistically shown that venture-backed companies were three times more likely to get their products to market in any given time period than those with other sources of financing. In determining the prospect of new opportunity, many researches have related it to potential company performance.

### *2.4.1 Measuring Firm's Performance.*

One of the methods to evaluate the high growth firm's potential performance is through the IPO. The prospectuses that come together during the IPO's of these high growth firms provide much of the information about the companies, thereby could assist in reducing information asymmetry. In relation to that, researches have suggested specific signaling models (Allen and Faulhaber (1989), Welch (1989), Leyland and Pyle (1977), Titman and Trueman (1986)), which could be used as tool to evaluate the firm's performance.

Hence, several research papers have evaluated the firm potential performance by examining the IPO prospectus. Even though the evaluations were not at the time of the first venture capital investment, nevertheless, prospectuses contain current information of the company as well as the history of the company and its management dating back to the time when the first venture capital was invested and in many cases to the founding of the company.

The literature is replete with discussions of what are appropriate measures of performance. For example: Deedes, DeCaroris, and Coombs, (1998), Downes and Henckel (1987), Rappaport (1981) and Fama (1976) provide for measures of market value as indicator of performance of the firm. The reason being, market value represents the market perception of the present value of the expected future earnings stream.

Micalizzi (2001) uses price-to-book-value (PBV) and present value of growth opportunities (PVGO) when evaluating biotech firms' performance with respect to R&D expenditures. He has used PBV which is a function of the difference between the expected return on equity (ROE) and the required rate of return (IRR) on projects and PVGO which is a function of the difference between the current stock price and the present value of expected earnings per share (E(EPS)). This is due to future investment decisions are highly uncertain and the entire R&D process can be seen as a sequence of growth options.

Bosworth and Rogers (2001) have also used market value of the firm as a forward-looking performance measure when evaluating the role of innovation in firm performance.

On the other hand, Wang et. al (2001), has measured the performance (used as dependent variable) by referring to firm value. In this case the firm value is measured as the stock price multiplied by the total number of shares outstanding.

From the above discussions, Bosworth and Rogers (2001), Bygrave et. al (2001), Deeds et. al (1998), Downes and Henekel (1987), Rappaport (1981), and Fama (1976), and Wang et. al (2001) use market value or firm value as indicator of performance. The terms, “market value” and “firm value”, used refer to the same variable, which is “market capitalization”.

Since market capitalization is the most extensively used to measure performance, it will also be adopted as the dependent variable for this study.

#### *2.4.2 Performance Signaling Variables*

In analyzing the signal power of technological and financial variables in the performance of high growth firms, Wang et.al (2001) evaluated 2 sets of signaling factors, namely traditional factors and technology factors. The technology factors identified are; pending patents, patents, research and development expenditure, research and development personnel, alliances, and confidentiality agreements. The traditional signaling factors identified are; under pricing, ownership level, level of debt, underwriters’ reputation, and auditors reputation. They concluded that traditional factors dominate the signaling process and are relatively stable over periods of changing investors’ sentiment. On the other hand, only number of R&D personnel exhibit the most consistent result among technology factors.

In analyzing the relationship of firm value to the quality of human resources and fundamental accounting variables, Ayuso, Campos, and Molina (2000) used market value as the dependent variable to measure the performance. They pointed out



that traditional fundamental analysis ignores the existence of some intangible assets, such as intellectual capital, that are currently considered as the main determinants of value. This resulted in understating the current value of the firm and its future profitability. Therefore, the intangible-intensive companies may be wrongly considered as not useful for investment and credit decision-making. To assess the extent to which investment in human resources are relevant, they have used the ratio of labor costs to total costs (*as a measure of intensity*) and the labor cost per employee (*as a measure of quality*). The results of their analysis on the Spanish stock market revealed that the market value of firm is only associated with the quality of human resources but not with human resources intensity variables.

Bygrave et. al (2001) used three market value variables to gauge for performance. The first variable is market capitalization which is measured as the initial offering price of the stock times the number of shares outstanding after the IPO; the second variable is the times return, which is the IPO price divided by the price per share paid in the first round of venture capital adjusted for conversions (from preferred to common), and the third is the rate of return (IRR). The examined independent variables are: management team, market/industry, technology and financial criteria of 117 IPO's of NASDAQ venture capital companies. The management team criteria is measured by; experience of the founding team, years in the market, and management experience. The market/industry criteria are; market size, market growth rate, market share, distribution channels, and life-cycle stage of the industry segment. Technological criteria included uniqueness of the product or service, and patents or copyrights. Operating and financial criteria included annual revenue, growth rate, profit margin, cash flow, time to profitability, returns on assets,

returns on equity, price-to-earning ratio, time from the first round of venture capital to IPO, and times return and internal rate of return on the first round of venture capital.

The results of the analysis by Bygrave et. al (2001) provided strong evidence that the market capitalization of the companies at the time of the IPO is related to pre listing R&D expenses, management quality, sale revenue, sale revenue growth, and industry stage. The results of the profitability measures of gross margin and net income are however found to be insignificant.

Zhen, Lev and Narin(1999) have found that the quality of technology appears to be positively correlated with firms return on investment and market-to-book ratios.

Investments in software have also been found to be associated with the market value of companies by Brynjolfsson & Yang (1998) and that, the costs associated with the implementation of new hardware and software could be capitalized and subsequently amortized.

From the survey of the previous literature, performances of the VC companies have been evaluated from a few different perspectives, such as; the relationship between company performance (PBV and PVGO) and intangible assets (Ayuso et.al (2000)); Wang et.al (2001) evaluated the company performance (firm value) in relation to technological and traditional signaling factors; while, Bygrave et. al (2001) examined company performance (market value) in relation to management team, market/ industry, technology and financial criteria.

Since the overall motive of this study is to recognize the variables which are of significant relationship with the Malaysian high growth and high technology companies' performances, a hybrid model combining the relevant and available variables of the MESDAQ market will be evaluated.

In comparing the VC evaluation criteria between seven Asian countries and that of USA, Pandey (1997) noted that in USA, the focus is more on qualitative factors, particularly on the characteristics of the entrepreneur. While in Asia, there are noticeable differences among countries. In Singapore, Japan, India and Thailand, considerable focus is put on the entrepreneur's personality and experience and fewer considerations are given to financial criteria. In Sri Lanka and Taiwan, the venture capitalists put considerable focus on financial considerations. While in Korea, venture capitalists do not consider characteristics of the entrepreneur as the most important evaluation criteria. Based on the data available from the MESDAQ listed companies prospectuses, this study will analyze the significant variables for VC valuation in Malaysia.

## **2.5 Theoretical Framework.**

The model combining all the relevant signaling factors from the literature is considered, however, based on the analysis of the prospectuses of the companies listed on the MESDAQ market, only those relevant available independent variables measuring company's performance are chosen. The independent variables are classified into four categories: technological factors (number of patents, number of R&D members, and number of alliances), financial factors (annual revenue, debt to equity ratio, cash inflow to sales ratio, and profit margin), traditional factors (level of underpricing and owner's interest), and type of firm (VC/non-VC firm and IT/non-IT firm).

Since market capitalization, which is a close approximation of firm value, is the most extensively used measure of performance, it will also be used here as the dependent variable in this study.

## *Technological Factors*

### *2.5.1 Number of Patents*

A few studies relate patents to the firm's capability and competitiveness. For example, Pegel and Thirumurthy (1996) claimed that patent related measures are useful in assessing the technological competitiveness of a firm and a good proxy for advances in technical knowledge. Levin (1987) indicates that patents are often the most marketable assets for technology firms. In comparing different measures of inventive activities, Mueller (1966) concludes that R&D and patents are the effective measures of inventive activities.

Number of patents reflects innovations and capabilities. Hence, it conveys signals about performance and therefore, it is reasonable to expect investors to use patents as signals about the value of the firm.

### *2.5.2 Number of R&D personnel*

Mueller (1966) have used the number of R&D personnel to measure firm's inventive activities, however the result was insignificant. However, Wang et. al (2001) has obtained a positive relationship between firm's value and number of R&D personnel. Theoretically, the higher the number of R&D personnel, the more the R&D activities could be carried out. Hence, a positive relationship between number of R&D personnel and the firm's value is suggested.

### *2.5.3 Number of Alliances*

The literature on alliance has found that innovative alliance partners may provide important learning benefits to firms (Hagedoon & Schakenraad, 1994; Stuart, 2000;