

The Financing of Early Staged Technology Based Firms in Malaysia

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Abstract: The establishment of various agencies to support and finance researches in universities and research institutes capable to grow technology based firms (TBF) was due to the Malaysian government's recognition of technology entrepreneurship as an avenue to develop the economy industrially. The government agencies and their ministries make available certain chunk of early capital dedicated to funding research and development (R & D), patenting, licencing and prototype development of technology entrepreneurs who are successful in coming out with innovative ideas. TBFs have been widely accepted by researchers as a key influence in the economic development, wealth generation, employment and creation of new innovations. Although, despite huge investment in research and development (R & D) and other public support from government to these group of firms, they still encounter difficulty in accessing the right and adequate amount of investment capital required to grow their firms to successful and global companies. The objective of this particular research is to find out the financing sources for TBFs in Malaysia. The researchers interviewed 28 technology based firms and 19 venture capital firms in Johor Bahru and Kuala Lumpur in Malaysia through a qualitative approach to data collection. The data collected was transcribed, analyzed and coded with the aim of identifying the emergent themes relevant for the theme development for the study. Conclusions are drawn from the study findings and recommendations made.

Key words: Financing Sources • Entrepreneurship • Government Fund • Venture Capital • Commercial Banks • Research and Development

INTRODUCTION

Innovation plays a very vital role in developing economic growth through focusing on science and technology-based knowledge [1, 2] and has become an essential tonic for growth in both advanced and growing nations. There is an acceptance that all over the world productivity, living standards and long-term economic progress can be improved through technology innovations, which is a product of new scientific and technological knowledge [3, 4]. Innovation system infers many such features as; banking industry, venture capital firms, technology transfer offices, management consulting company, small and medium sized firms, the entrepreneurs and so on [5]. These aforementioned variables are required to make use of the outcome of the research from universities and other research institutes. On going study however, suggested that innovative ideas presumes

something more such as, commercializing, marketing, financing which are needed to design high-quality science and technology authentic innovations. Distribution of knowledge was regarded as an important determinant of innovation and it was reported that rate of innovation has a positive effect on the growth rate of output in all industry [5, 6, 4]. The recognition of innovation as an avenue to quickly grow the Malaysian economy industrially was among the reasons government have encouraged entrepreneurship through the provision of early capital to potential TBFs in the country. These early financing was allocated to interested and willing technology entrepreneurs through dedicated public agencies and some government ministries to provide certain support in technical expertise, training, disseminating information and financing. Other researchers also emphasized that TBFs are perceived to be a key influence in the economic development, wealth

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generation, employment and creation of new innovations. Although they are usually characterized by the paradigms liability of newness and resource poverty and also lack technical and marketing capabilities, besides they also suffer from poor management, inability to find early stage financing and high overheads. However, considering the revelations above, the aim of this study is to find out the sources of financing for TBFs in Malaysia. This article will be structured by reviewing empirical literatures on technology entrepreneurship, problems in financing TBFs will be highlighted, followed by financing sources for TBFs, the the financial death valley will briefly be looked into and finally financing hypothesis such as the agency theory and asymmetric information problems will be reviewed. The next section after this shall be the methodology section, followed by the discussions of findings and lastly the conclusion part of the entire article will be presented.

Technology Entrepreneurship: Dorf and Byers [7] emphasized that, technology entrepreneurship is a form of business leadership based on the process of recognizing high-potential, technology-intensive business opportunities, gathering resources such as talent and cash and managing rapid growth using principled, real-time decision making skills. An attractive business opportunity was stated to consist of a great value proposition, technically feasible products, protectable intellectual property, a sustainable competitive advantage, a large potential market and a proven business model. The authors maintained that ideas of this nature could be based on either a revolutionary break through in technology or evolutionary advancement; and it could at the same time be a target to an existing market or create an entirely new one. This entrepreneurial process is applicable to independent start ups and established corporations [8, 9]. Authors have referred to technology as a branch of knowledge that deals with industrial arts, applied science and engineering and a process, an invention, or a method. They mentioned further that technological change takes place either through pure invention or process innovation and includes devices such as artefacts, processes, tools, methods and materials that can be applied to industrial and commercial purposes. Technology entrepreneurs use technology as their driving factor in transforming resources into goods and services, creating an environment conducive to industrial growth. Nicholas and Armstrong [10] provided another concise definition of technology entrepreneur as someone who organizes, manages and assumes the risk of an

engineering business enterprise. Technology entrepreneurship was recognized by the Malaysian government as a force that can create huge impact on growth, recovery and societal progress by fuelling innovation, social empowerment, economic empowerment, employment generation and productivity. This assertion led SIRIM established under Ministry of Science, Technology and Innovation (MOSTI) to assist technopreneurs in obtaining the relevant standards and systems that are pertinent for them to enter desired market both locally and internationally [11, 12].

Technology Entrepreneurial Process: Price [13] emphasized that in trying to understand the differences and similarities between a conventional and technology entrepreneur, it would be useful to understand the entrepreneurial process both have to undergo. However, they enumerated that technology entrepreneurial process involves seven stages of the entrepreneurial life cycle. In the Figure 1 is the technopreneurial process model as studied by Price.

Importance of Technology Entrepreneurship: Technology based firms are registered companies which is an outcome of the efforts of technology entrepreneurs; they produce high value-added products that have rippling effect or spill-over effects on other companies [14]. TBFs could either be from the inventions from universities, research institutes or conventional technopreneurs without any affiliation to any of the earlier mentioned two sources. Employment creation, the generation of wealth and R & D spill-over benefits have been identified as the three major contributions of technology entrepreneurship.

Characteristics of Technology Entrepreneurs: Bulsara *et al.* [15] elucidated on two options open to technology entrepreneurs to commercialize their patented technology innovations and advanced that an innovator who does not possess an enterprising tendency or entrepreneurial characteristics should opt for technology transfer (licensing) while one who has a strong entrepreneurial characteristics and enterprising tendency would be most suited for techno-entrepreneurship. They go further to explain the basic characteristics that would be expected of a technology entrepreneur to be successful as: Need for achievement, need for autonomy and independence, creative tendency, moderate and calculated risk taking, drive and determination.

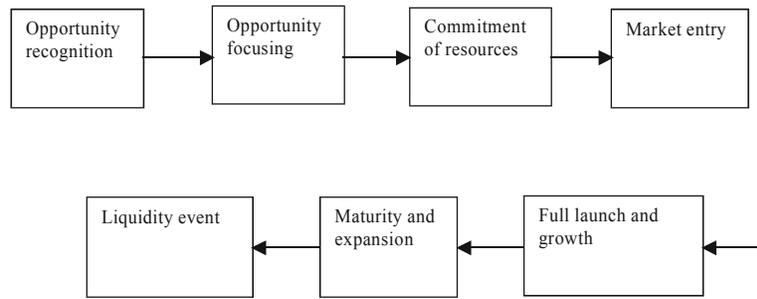


Fig. 1: Technopreneurs Process Model
Source: Adapted from Price [13]

Problems in Financing Technology Based Firms:

Technology Based Firms during the early development phase are facing funding problems [16]. These problems are believed to be mainly as a result of the cyclical nature of both product sales and R & D expenditure associated with these kinds of products. However, further evidence was put forward that the fast growth nature and subsequent diminishing of sales over time from an initial new product indicate that the returns from these companies may not be consistent [17, 14, 18]. The nature of returns from TBF’s product and the manner of scrutiny coupled with the credibility of lenders limits their ability to pay back their debt. Commercial banks are therefore typically cautious of lending to tech based firms and particularly those in the early stages of development. Mason and Harrison [19, 20] identified the reluctance of traditional lending institutions to invest as a reflection of the problems of distinguishing between good and bad technology businesses and furthermore, the lack of expertise of commercial banks in this sectors, coupled with the limited collateral of entrepreneurial managers. Mason [17] further investigated why there is a shortage of financing to small firms especially the TBFs and find that, the problem of information asymmetry and moral hazard constitute the major challenge. He highlighted that information asymmetry is a situation where the entrepreneurial manager is in possession of substantial and relevant information about his own abilities and the prospects of the venture than the potential investor. The TBF owner is not willing and ready to share this information with the investor and the investor is not capable to access this information from historical data due to newness of the firm. The investor has to engage in a lengthy due diligence to obtain relevant information about the firm and the entrepreneur. It was highlighted that the difficulty to value the intellectual property (IP), scientific knowledge of technology sectors, as a result of newness and untested market and lack of commercial skills of the

management team. Further evidence was provided by [16, 17] that dealing with moral hazard problem is another constraint because it is very costly for the potential investor to engage in complicated contracts signing that are time consuming to design and negotiate and labour intensive monitoring systems. Because of the costs involved in investment appraisal and monitoring are fixed regardless of the size of the investment, this makes small investments uneconomic for funders [14]. Although many external equity financing opportunities are available to finance TBFs through their anticipated growth stages, yet many of the TBFs still find it difficult to raise external equity [20, 4, 3]. This may largely be a result of the high risk nature of technology investments which reflects the innovativeness of the products and processes, the specificity and size of capital inputs required, the often intangible nature of the capital base, the financial inexperience of the founders and the attitudes, practices and imperfections in the capital market [20].

Constraints to Commercialization: Becoming a successful entrepreneur, entails the ability and zeal to succeed in raising funds, that is finding and convincing some kind of sponsor. The ability of an inventor to find a willing financier determines how quick his innovation can be commercialized. However, there are several challenges faced by technology inventors in commercializing their innovations [20].

The Financial “Valley of Death”: TBFs face problems whenever decision is taken on whether to commercialize an innovation as the risks are increased. Firstly, significant investment is definitively required if the TBF want to transform the product into commercial quantities of a product from a prototype. Secondly, usually public funding will end at creating a risk profile that is also called “The Valley of Death” for innovations. It can be considered as a barrier to the development and

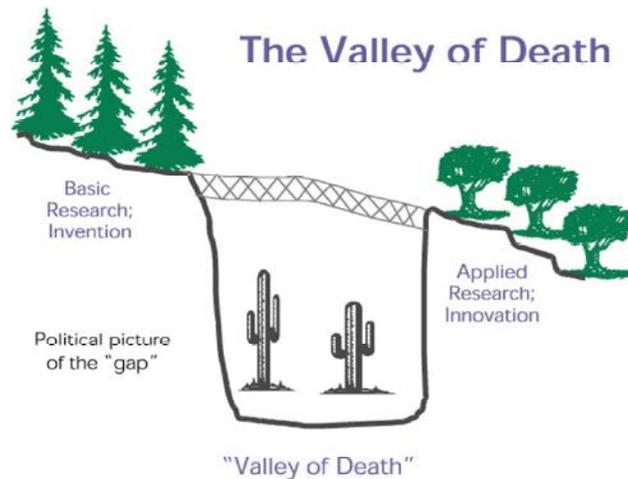


Fig. 2: The Valley of Death Image [18]

commercialization of the innovations as it is very difficult for firms to share the risk [21, 14]. Authors previously revealed that there is an existence of valley of death at the intermediate stage of the innovation sequence because the financing is not available to finance the individuals and firms for taking a new innovation or discovery and transform it into commercial products [18, 22]. Figure 2 shows the valley of death image for a typical technology firms as it progresses from the basic research stage through the valley stage to the next stage of pre-com and commercialization.

Financing Sources for Technology Based SMEs: There are different types of financing possibilities available to TBFs. This group of companies may rely on family funding, loan from friends, overdrafts or personal loan from banks (financial bootstrapping). There are two strategies involved in financial bootstrapping (FB), adopting strategies that reduce cash requirement by securing resources at little or no cost. TBF managers may for example rely on their personal relationship to secure free access to certain resources. Also they may adopt strategy to secure resources without making use of commercial bank funding or external equity funding. They may also obtain capital through subsidy financing or personal sources of finance [23, 8]. For other projects with high growth potentials, a TBF owner can access funds from private investors known as VCFs and or BA. Lam [24] in his studies of FB discussed that despite unequivocal evidence that more than 90% of technology based firms are financed through informal sources and that more than 60% of the early capital is financed by business founders. Lam posit that the most common type of financing young technopreneurs at the early stages of

growth is through informal sources and that both equity and debt sources are formal in nature because of the official and strict screening criteria (due diligence, business proposal screening) they adopt before funding is allocated to TBFs [24].

Financing Theory and Hypothesis

Agency Theory: The epistemological object of the agency theory is the relationship between the principal and the agent. The theory deals with an efficient delegation of tasks between principal and agent. Ross [25] posit that an agency relationship occurs between two (or more) parties when one, designated as the agent, acts for, on behalf of, or as representative for the other, designated the principal, in particular, in the context of decision problems. Agency relationships exist in many occurrences such as buyer/supplier, employer/employee and stock holder/top executives. The objective of the agency theory is to explain problems associated with agency relationship and finally to determine the optimal institution for regulating this relationship [26, 27]. The basic assumptions of the agency theory say that the involved parties behave under bounded rationality, pursue different objectives, have different risk preferences and maximize their self-utility.

Asymmetric Information: Fund managers can manage risks related to asymmetric information in a number of ways and this can be maintained assuming that three control mechanisms are common to almost all VC investments; The use of financial contracting, most commonly used by financing through convertible securities, syndication of investments, incremental financing. However, designing specialized financial contracting is commonly used to minimize agency costs

[13, 18]. In managing risks resulting from various contingencies, complex contracts are often formulated in order to influence the agent's behaviour or influence the outcomes of a certain events.

Research Methodology and Design: The respondents who participated in this study are 28 technology entrepreneurs and 19 venture capital firms based in Johor Bahru and Kuala Lumpur. The response rate for this particular research question is 100% (47/47*100). This high rate of response shows how important financing is to the Malaysian technology entrepreneurs. The data utilized for this study was gathered through a qualitative face to face interview [28, 29], after which they transcribed data was sorted, coded and important codes that emerged was used to plot graphs and tables required to explain the findings and discussions section of the research. Hence, mentioned here is the particular objective of this research: To find out the financing sources for technology based firms in Malaysia. However, so as to achieve this earlier mentioned objective, the following research question was posed and answered in this study; Research Question: What are the financing sources for technology based firms in Malaysia?.

DISCUSSION

The aim of this study is to find out the financing sources for technology based firms in Malaysia. Hence, the basics of this discussion commenced by understanding the themes that have emerged from the literature review section before moving to the sub-codes from the interview schedule and then finally the emerging codes as grounded in the interview data also sorted. Venture capital investors consider various opinions when decisions to select potential TBFs are to be made. They are looking for highly innovative firms that will yield high returns in a very short while. This particular research reveals that there are many financing opportunities for TBFs to grow their innovations in Malaysia, although there are processes to be followed before this is achieved. This section contains a series of case studies intended to give the reader insight into the experience of technology based firms and the attendant financing firms who were interviewed. Each case study presents a summary-level description of the entrepreneurial and financing activities involved in the process, including the earlier mentioned codes which emerged from the objectives and research questions of the study. This section presents the case analysis carried out which shows a more in-depth

comparison and evaluation of the entrepreneurs' experience in the process of trying to source funding for their technologies and the involvement of government support agencies in the process. Thus, other attributes from the transcribed interview data emerged and this helped to give more meaning to the subject of discussion in this section as propounded by the grounded theory approach to qualitative research methodology.

Sources of Financing for Technology Based Firms in Malaysia:

Several studies have recognized that the TBF founder's savings, as well as the assets of family and friends are often the foundation of seed capital [27]. Although funding needs differs by industry [19], for the many of TBFs internal equity and profits alone are not adequate to meet the high capital exigencies for development and progression to the next growth stage. Winton and Yerramilli [30] show theoretically that VC financing is preferable to debt financing only under conditions of high risk and uncertainty. Other frameworks find preference for debt over equity with aligned interest and lower cost of capital for entrepreneurs. There was a rallying point that equity contracts dominate when interest of entrepreneurs and investors are poorly aligned and as investors' cost of capital increases. However, while TBFs are still in the very early stages of development many of such firms are forced to seek external investment capital. For many technology based firms, external equity finance is more appropriate for their financing needs than debt finance [14, 16]. There are different types of financing possibilities available to TBFs. This group of companies may rely on family funding, loan from friends, overdrafts or personal loan from banks ie internal capital or otherwise known as financial bootstrapping [23]. However, findings from this study shows that two group of TBFs are common in Malaysia, also the sources of funding to either of these group of TBFs depend on the background of the inventor or innovator. The first group is the TBFs who are domiciled in the academic environment and or research institutes. This category of TBFs spin out innovative young firms as a result of the outcome of their R and D activities financed through grants from the government. Such grants allocated to these agencies of government helped to focus on areas that innovations can be discovered and hence moves from that initial stage of idea generation, R & D, prototype development, pre-commercialization to the later stage of commercialization. Furthermore, for TBF whose background is not from the academic environment, they

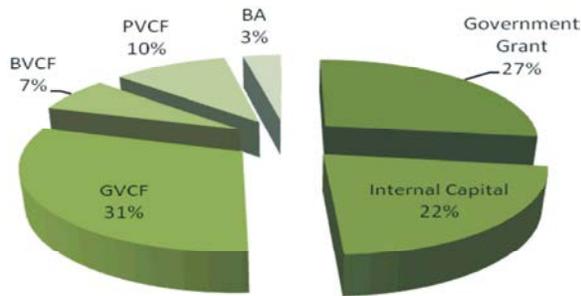


Fig. 3: Pie Chart for Sources of Funding for TBFs

have huge task of going it alone through the early phase of idea to R & D to prototype until commercialization. Although as they progress along this channel, the role of government come to play and they start to benefit from a few of the established government supported venture capital firms (GVCFs) in areas of financing their innovations. Findings reveal that in Malaysia, majority of the TBFs affiliated to either a university or research institutes source their main seed capital from government research grants. The findings on conventional technopreneurs is consistent with previous research from Tyebjee and Bruno [27, 31] and other authors that TBF founder's savings, as well as the assets of family and friends are often the foundation of seed capital [32]. While it is inconsistent for academic technopreneurs because the founder's initial investment is provided through various categories of government funding schemes from research, development and commercialization (R, D & C) Fund. Majority of the respondents interviewed for this study are from academic background; hence, the source of their funding at the very early phase of firm development is from government sources. Figure 3 represents the pie chart distribution for the sources of funding adopted by TBFs to finance their technologies based on the question asked about the sources of capital to finance their technology. From the respondents responses as indicated in the pie chart, majority of the firms interviewed (31%) mentioned that they are funded through funds invested by GVCFs, followed by government grants (27%), internal capital or bootstrapping (22%), Private Venture Capital Firms (10%), Bank Venture Capital Firms (7%) and lastly by Business Angels (3%). This scenario shows that involvement of BA is still at the low ebb in Malaysia, while public fund still dominates investible funds in the country. This means that at this stage of growth, government fund is very instrumental to the development of technology based firm's growth until they can cross that valley of death stage when they will be qualified for external equity.

Further findings from this research confirm that external funding provides the resources which enable universities to conduct R & D. This includes both government funding [3] and industry funding through contract research or sponsored research [33, 9]. This is consistent with the findings from this particular study that shows that Malaysian universities are typically funded with funds provided by government through funding agencies such as the Ministry of Higher Education (MOHE), Ministry of Finance (MOF) and Ministry of Science, Technology and Innovation (MOSTI). These ministries allocate certain chunk of capital as grants to finance R & D and other technology related projects through certain specialized research councils domiciled in the universities as research alliances. With these efforts, many research universities in Malaysia are trying to engage in commercialisation of intellectual property (IP). To encourage commercialisation activities through the formation of spin-off companies, the government provides other types of grant, through MTDC, MAVCAP, Cradle Investment Fund, BIOCORP, MLSCF or as the case may be. These grants are actually seed money to fund a technology based firm and to further develop their inventions up to the prototype stage. In Malaysia, the particular funding type and the sources will determine how the technology will be managed. For example, funding through university research grants will be managed through the technology transfer fund (TTF) taking charge of the technology for exploitation and commercialization. But if the funding is sourced in collaboration with the industry, then there have to be an understanding on how the technology will be commercialized. Aziz *et al.* [34] opine that Malaysian universities have been recognized as among the main development agent for the speedy growth of the economy. This is reflected in the huge amount of investment of public funds into research activities among the universities by the government. The investments made are in expectation of rewards that can be generated by the researchers as well as enriching the growth of the country's economy. There are a number of funds, grants and incentives made available by the government to enable innovation and business creation among the universities. Some examples of the government initiatives reported are;

- Under the 9th Malaysia Plan (2006 - 2010), government invested a total of RM3.101 billion in the form of R&D grants.

Table 1: Malaysian Government Funding Schemes

| No | Funding Scheme | Purpose |
|----|--|--|
| 1 | Cradle Investment Program (CIP). | Seed funding for turning technology oriented ideas into commercial ventures. The programme also include a sub-programme for university spin-outs and start-ups; University Cradle Investment Programme (U-CIP). |
| 2 | Demonstrator Application Grant Scheme (DAGS). | Managed by the Ministry of Science, Technology and Innovation (MOSTI). It is seed fund for ICT-based community pilot projects. |
| 3 | eContent Fund | Managed by MOSTI. Fund for content creation projects. |
| 4 | InnoFund | Managed by MOSTI. Fund for innovation commercialisation projects. |
| 5 | Multimedia Super Corridor (MSC) Malaysia Intellectual Property (IP) Grant Scheme | Managed by Multimedia Development Corporation (MDeC). The scheme provides subsidy up to 70% of IP protection costs. However, this is done in reimbursement basis and application should be made after the process had been done. |
| 6 | MSC Malaysia R&D Grant Scheme (MGS) | Managed by MDeC. The scheme provide grant for R&D activities conducted in Malaysia. |
| 7 | eScience Fund | Managed by MOSTI. The fund for R&D projects in priority areas largely targeted by universities. |
| 8 | Techno Fund | Managed by MOSTI. Fund for pre-commercialisation projects and IP acquisition. |
| 9 | MSC Malaysia Technopreneur Pre-Seed Fund Programme | Managed by MDeC till 2009. This was transferred to CIP and rebranded as CIP Catalyst pre-seed fund programme. The fund is for technopreneur start-up creations. |

Source: MOSTI¹¹

- Whereas, under the 10th Malaysia Plan (2011 – 2015), the government allocated RM741 million for R&D among the universities for the first two years of the five-year plan. The allocation was to be managed by the Ministry of Higher Education.
- In line with the new directives, the ministry announced a set of 4 R&D schemes to utilize the RM741 million allocations.
- In addition to the sum of RM191B announced in year 2010 with the aim to create an economy based on innovation, where university research, development and commercialization is among the important success factor.
- There are three new aspects of the schemes, namely, the ERGS, LRGS and PRGS. Previously the Ministry only had one R&D grant scheme, the FRGS. The introduction of ERGS, LRGS and PRGS, reflects the government's desire to enhance the research, development and commercialisation activities among the universities. The three new schemes bridge the gap between university R&D activities and the programmes in place to drive commercialisation and business creation.

This effort which is among the objectives of this study is aimed to find out the sources of early stage capital for financing technology based firms in Malaysia. The involvement of government in financing TBFs from the seed stage is to prepare the ground for external equity

investors to take over the TBFs at the next development stage and help nurture them to successful exit. Table 1 shows the Malaysian government funding schemes from various agencies and the activities they are meant to finance.

Sources of Capital for Equity Investments

Public Funding: This research finds that VCFs also source their capital under management from a variety of sources, this capital is channeled to support TBFs grow their innovations from the early stage through concept formation to commercialization for mass marketing, licensing to spin off, licensing to established companies or possibly IPO as the case may be. However, as shown in the Figure (4) 42% of the venture capital firms interviewed for this research claimed that the source their capital under management 100 % from the Malaysian government through some specialized agencies such as Ministry of Science Technology and Innovation (MOSTI), Ministry of Finance (MOF), Ministry of Higher Education (MOHE) and others. These government supported VCFs are funded 100% by the government and are saddled with the responsibility to invest in specific areas of research and innovation that will benefit the economy. While (31+27=48%) of the technopreneurs interviewed (Figure 3) mentioned that they raised their early capital through support from public funded organizations.

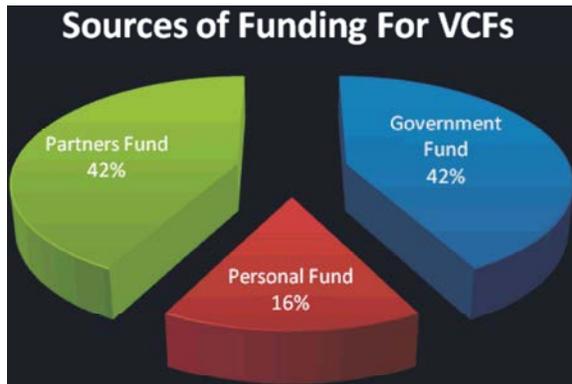


Fig. 4: Sources of Funding for VCFs

Personal Funding: This research finds that only a negligible number of active venture VCFs in Malaysia source their management capital from personal sources. Referring to the Figure (4), just a paltry 16% of the respondents answered that the capital they invest was sourced from personal sources and 42% mentioned that they got money contributed by other business partners into their VCFs. Conventional technopreneurs or rather non-academic technopreneurs are individual researchers with innovative ideas who are not affiliated to any university or research institutes and hence do not most often have access to R & D funding from government ministries and agencies to support their inventions at the R & D phase. 22% of the respondents (Figure 3) who belong to this category of technopreneurs responded that their early capital was raised through unconventional sources such as from personal savings, subsequently when the need arose for more capital as the research progresses, they contact family members, friends, potential suppliers who believe in the idea they are working on and hoping that they will benefit in one way or the other if the idea succeeds in future.

External Partners

VC FIRMS: This research finding reveal that Malaysian VCs have affirmed their willingness to invest a substantial size of capital in TBFs even at the pre-seed stage but they feel that they possess the knowledge to help budding entrepreneurs shape their businesses and take them to the next level. However, they want to get involved in the businesses, not just give money to them to make money for them and they look at investment sizes that range from RM 200,000 to RM 2 million. In this study, the amount VCs invest in a particular TBF will depend to a greater extent on the type of innovation, location of firm, industry, funding capacity of VCF and the stage of

growth they are and above all the national policy of government. This study findings is in line with Ajagbe *et al.* [32] who reported that the desire for the government of Malaysia to achieve the ambition of being among developed countries by year 2020 motivated the establishment of certain innovation and venture capital promoting agencies in the country, such as MAVCAP, MTDC, Modal Perdana, Cradle Fund, Biotech Corporation to mention just a few. This is in recognition of the fact that the importance of equity financing in speeding up the growth of the domestic economy cannot be underestimated. The emphasis of government-backed venture capital companies in Malaysia is on early stage or start up technology firms because they find it almost impossible to raise adequate financing from banks and other traditional financing institutions. In Malaysia, private VCFs source their capital under management from Personal Funding & with ex-Partners and sometime they do have a kind of third party arrangement with some government VCFs, because they allocate certain chunk of capital to private VCs and commercial banks interested in equity financing and these firms further re-invest in capable and qualified TBFs. Figure 4 is a representation of the frequency distribution of the responses of VCFs who participated in this study. It shows the number of respondents who expressed their opinion on the question asked and revealed that the preferred sources of funding VCFs use to fund TBFs are mostly from government sources (42%), partners capital (42%) and lastly and least utilized is from personal sources (16%). What this means is that contribution of shareholders and government sources indicates an equal share of ownership of majority of VCFs interviewed for this study, while share capital from individuals represent a lower proportion of the ownership structure of many VCFs.

Business Angels: Previous studies report that the VC market consist more than just the institutional VC industry, however, there is an informal VC market comprising successful individuals regarded to as "Business Angels" who provide risk capital directly to young and growing technopreneurial ventures in which they have no family relationships [19, 17]. There has been an astonishing swing away from investing in early staged firms in support of sectors in growth mode which have bigger capital requirements [14]. This exposed the need for BA to have become an important source of new capital for new and young entrepreneurs. Informal equity investors such as business angels are reported to finance TBFs in terms of more Dollars and number of ventures the

fund especially in the USA [32]. Findings from this study turn in contrary reports about the activities of business angels in Malaysia. Reports from this study shows that BA are still very few and insignificant in terms of equity financing, although there are quite a negligible number of them available in the country, it is hoped that the concept will grow with time. This assertion can be confirmed from the responses of TBFs interviewed for this study, only 3% of the interviewed respondents mentioned that they received funding from business angels (Figure 3).

Commercial Banks: Findings from this research reveals that commercial banks who invest in TBFs do this by adding value to the firms they give money to, because some of them play both roles as debt financier and equity investors, then juggle their responsibilities for both position by contributing their expertise to grow the firms they finance. Commercial banks in Malaysia understand that even though it is a debt finance, the ability as a client to pay back and make more profits ensure that entrepreneurs come back to ask for more and the cash flow through the bank makes the bank grow further. Although commercial banks generally are typically cautious of lending to tech based ventures and particularly those in the early stages of development as noted by [18, 20] who identified the reluctance of traditional lending institutions to invest as a reflection of the problems of distinguishing between good and bad technology businesses and furthermore, the lack of expertise of banks in this sector, coupled with the limited collateral of entrepreneurial managers. This is evident in the result of this study which show that only 7% of TBFs interviewed for this research sourced their investment capital from commercial banks (Figure 3).

Problems in Fund Raising for Technology Based Firms: Usually as reported by several authors in developed countries, it is a common knowledge also in Malaysia that the most challenging aspect of development of TBFs is the area of accessing growth capital. This is supported by the research of known authors such as [17, 14, 16, 35] that the major problems associated with financing TBFs especially at their early development phase is as a result of the cyclical nature of both product sales and R & D expenditure connected with these kinds of companies. However, in this research, the researcher found several difficulties TBFs mentioned as affecting their ability or delay in growing their technologies to successful exit. Although many are reported in the transcript but just the most important reasons are presented in this section;

- Convincing investors about the applicability of technology
- Problems of identifying the right funding scheme
- Inadequate collaborations from industry partners
- Inadequate research facilities and personnel
- Skeptical perception of Malaysian innovations

Convincing Investors about the Applicability of Technology: Among the problems TBFs in Malaysia encounter is in area of convincing investors about the applicability of their technology as the main difficulty they encountered before their firms were selected to be funded. It was also very challenging convincing (pitching skills) the funding agencies to understand the commercial applicability of technologies at the very early stage of development.

Problems of Identifying the Right Funding Scheme: The ability to raise growth capital depend to a large extent on ‘whom you know’ specifically put as your ‘technical know who’ as they think it is not easy to know what fund a TBF is qualified for and understanding the specific requirement of each funding agency.

Inadequate Collaborations from Industry Partners: The area of going into collaboration with industries has been a major setback to the growth of TBFs as industry does not want to invest so much in R & D, what they prefer is seeing technologies that are ready to be commercialized. Industries in Malaysia do not want to partner with universities because of the crisis of owning the IP of the technology after licensing.

Inadequate Research Facilities and Personnel: The issue of inadequate facilities, enough laboratory space and adequate research manpower in public universities and research institutes hinders or limits the ability of TBFs to achieve the scale they desire to attain. It takes time for researchers in Malaysia to be able to convince industry partners to allow them access to some of their facilities to test their innovations.

Skeptical Perception of Malaysian Innovations: Industry collaborators and mostly foreign VCFs have this mindset that innovations from Malaysian researchers and inventors are not sophisticated enough for global market. They do not have confidence in researchers from the universities hence; do not believe in the sophistication of innovation from university laboratories. There is this saying that the research from Malaysian universities often

end up in the laboratories and may not be commercializable to a large scale, making investors reluctant to invest in innovation from Malaysian universities.

CONCLUSION

This article is focused on the relevant question the researcher try to find out from this study, which is aimed at finding out the sources of financing for technology entrepreneurs in Malaysia. It highlights the background of the problem which then leads to the problem statement, research questions and the objectives of the study in order to understand the studied perspective. A brief literature review is carried out to understand the background of the research. Although several other researches recognized that there is insufficient investment in technology business financing in the country and that only a few financial organizations are interested in this sector, hence, there are not enough investment funding to support technology based firms to move to the next stage of growth of the TBF life cycle. This study finds that there are many financing agencies supporting the growth of technology based firms in Malaysia right from the early development phase to maturity. Furthermore, it reveals the encouraging stance of government to ensure that young technopreneurs with innovative minds are supported to develop their ideas to tangible products and services. Malaysian universities are also highly funded to ensure that they engage in R & D that is aimed at generating innovative products that could develop to global companies and hence boost job and wealth creation for the economy. The themes that have emerged from this study can help technology entrepreneurs understand the available financing sources in the country and as such help them to access suitable and adequate financing to grow their ventures. The findings from this study however, provide a theoretical basis to understand the relationship and interaction between financing agencies and technology entrepreneurial ventures in Malaysia. Finally, this research will add to the many archive of study in this area because until now, search through academic databases have returned little information as regards this subject of investigation in Malaysia. Finally, the objectives of the study which is to find out the sources of financing for technology entrepreneurs in Malaysia have been achieved. However, it is worthy to note that the main limitation of this study is that findings from this study

may not be generalized but it is limited to the geographical areas covered and the number of respondents interviewed for this particular research.

ACKNOWLEDGEMENT

The authors wish to thank the International Doctoral Fellowship (IDF) of the Universiti Teknologi Malaysia for supporting this research.

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