

# **Government's Role as Public Venture Capitalist in High-Technology Small and Medium Sized Enterprises**

Jan Petrus Grundling, Lizl Steynberg & Anrui Wang  
Centre for Entrepreneurship, Tshwane University of Technology, South Africa  
Private Bag X680, Pretoria South Africa 0001  
Tel: +27 12 3825583 E-mail: [grundlingjp@tut.ac.za](mailto:grundlingjp@tut.ac.za)

*Productivity growth is dependent on technological advancement. However, capital constrains commercialization of technology, which venture capital could solve. Still, a capital supply gap exists between venture capital and technology commercialization, especially in the start-up stages of high-technology enterprises. The outcome of this research will provide guidelines for participation in the public venture capital industry. This research introduce the government as public venture capitalist for filling the gap between technology opportunities and technology commercialization and found that the government plays an important role in high-technology enterprises in developing countries. Further, the venture capital industry adopts various operational models, especially in developing countries that lacks legal and accounting infrastructure. In the infancy stage, government plays a catalyst, but indispensable role.*

## **Introduction**

Prevailing economic thought argues that technology is a key production factor along with capital and labour (Solow, 1956; Solow, 1957; Romer, 1986; Romer, 1987; Romer, 1990). Thus, the government including industrial and developing countries give more priority to the development of science and technology (S&T), and they formulate various policies and public programmes to directly and indirectly boost S&T innovation and development. These programmes emphasize the crucial role of innovation, higher education and Research and Development (R&D), in which innovation is an expression of the productive use of knowledge, and technology-based enterprises are recognized as active innovators and important contributors to technological progress and economic growth.

Given these motivations, the formidable link between innovation and entrepreneurial activity in the world has become increasingly important. People are now aware of this link and have begun to emphasize the ways entrepreneurship leads to greater national and global prosperity (Timmons & Spinelli, 2003). In these linkages, one form of government assistance is public or government venture capital programmes that are suppose to bridge the significant funding gap between innovation and commercialization.

Venture capital is alternately described as the engine fuelling innovation in the economy and as the instrument that fuelled the boom and bust of high-technology enterprises. Research on venture capital in developing countries has not emerged until very recently (Lerner & Schoar, 2002; Cummings, Fleming & Schwienbacher, 2005). In reality, governments as public venture capitalists, especially in developing countries, are playing an important role and have

set up public venture capital programmes. Although public venture capital programmes have become increasingly popular, it is not without controversy.

**Positive arguments**

Market failure has been a main economic justification of government programmes. Stiglitz (2000) summarizes six types of market failures namely incomplete markets, public goods, externalities, information failures, imperfect competition, and unemployment and other macroeconomic disturbances. Proponents of public venture capital programmes use the first four market failures as argument to support their position and assert that capital market failure leads to a funding gap and underinvestment in technology SMEs.

**Negative arguments**

The opponents’ biggest concern is the set of various distortions created by government programmes. One distortion is the rent-seeking behaviour of interest groups or politicians that take advantage of government programmes and their own benefits from possible beneficiaries (Buchanan & Tollison, 1984); another distortion is that bureaucrats may select enterprises based on their likelihood to succeed instead of the actual funding need in order to claim credit for the enterprises’ ultimate success (Cohen & Noll, 1991; Wallsten, 2000).

The debate about public venture capital programmes is a classical argument centered on market and government failures in the context of investment in Technology Small and Medium Enterprises (TSMEs). It is disputed whether government should become a venture capitalist and directly finance TSMEs. More proponents stress market failure as a defensible reason for providing sufficient seed funds to start-up TSMEs. Another concern is that government action could distort market mechanisms in the VCI. In either case, it is agreed that a significant funding gap exists in start-up TSMEs (Moore, 1994; Murray & Lott, 1995; Sohl, 1999; Hall, 2002). The above debate is briefly summarized and synthesized in Figure 1.

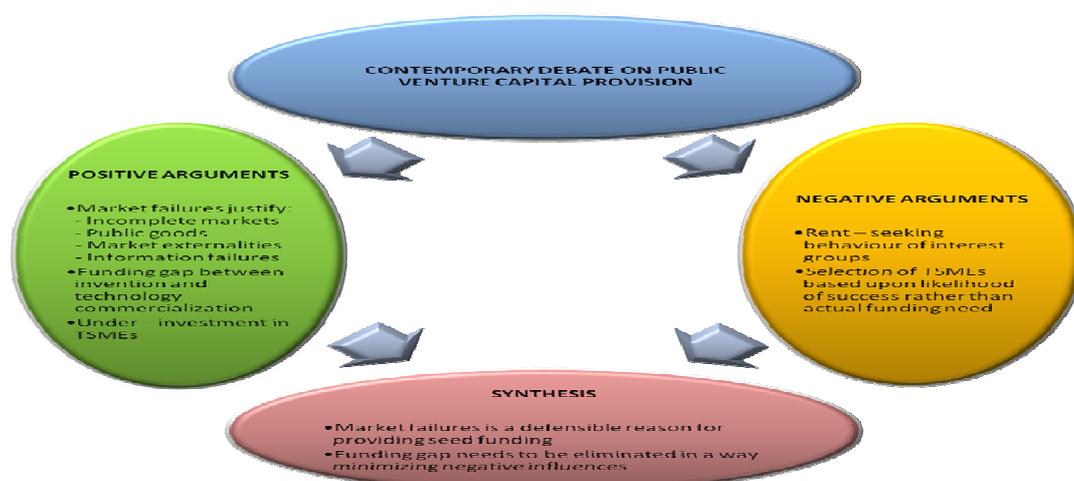


FIGURE 1: Summary and synthesis on public venture capital motivation

## Problem description and statement

The literature review indicated that the most of private venture capital are invested into the expansion stage of new TSMEs rather than into the seed or start-up stages, to avoid the higher risk in these early stages of technology commercialization. This financial gap is experienced by certain types of TSMEs, due to their investment demand range (it is more difficult to attract minor investments than major investments), life-cycle stage (start-up enterprises face more problems than established ones), the technology concerned (high TSMEs are at a disadvantage compared to those applying less advanced technology), or geographical location (TSMEs in the periphery will find it more difficult to access capital than those in the centre) (Harrison & Mason, 2000). In many Organization for Economic Cooperation and Development (OECD) countries, the share of start-up and other early stage investment are insignificant, and thus leave many TSMEs to battle with cash constraints, particularly those in the seed and start-up phases (OECD, 2003). It can be speculated that this constraint is even more serious in developing countries where the shortage of mature financial marketing mechanisms exist.

Thus, the question could be asked: *“How could high technology small and medium enterprises (TSMEs) access financial support in their early stages?”* A second question of equal importance, which needs to be addressed, is: *“What is the basic function of government in the fostering of high technology small and medium enterprises (TSMEs) in the early stages?”* The domain of the above question is restricted to the following secondary questions:

- Why is public capital support more important in developing countries than developed countries?;
- What are the approaches that government could utilize in developing TSMEs?; and
- How can government, as a public venture capitalist, perform more efficiently in a venture capital investment programme?

The research problem is therefore presented as a government challenge in filling the technology commercialization funding gap as depicted in Figure 2.



FIGURE 2: The government TSME challenge in technology commercialization

## Study design and method

The study design is based upon a system theory case study approach. In this research the

particular phenomena is to understand the public venture capital provision by governments in developing countries taking China as example, and the United States of America, Europe, Japan and Singapore as developed countries. In China, three TSMEs cases were studied, namely:

- (i) Suntech Power Holding Co. Ltd.; interested in TSMEs technology commercialization that received public venture capital and government support;
- (ii) China New Technology Venture Investment Corporation (CNTVI); a central government owned company, trying to provide funding channels to technology-based enterprises as compared to the government's traditional Science and Technology (S&T) system which failed to transform Research and Development (R&D) output into commercial technologies. It was closed by the People's Bank of China on June 22, 1998; and
- (iii) Innovation Fund for Small and Medium Technology-based Enterprises (Innofund); it was set up in 1999 after the CNTVI went bankrupt in 1998. It represents a milestone in China's public venture capital practice, and has become a model for the Chinese public venture capital programmes.

### **The questionnaire and interview survey**

To deeper probe the practical experiences in the real industrial environment, the researcher designed 30 questionnaires and 10 interview surveys which were administrated in China.

### ***Hypotheses and narrative impressions***

Two hypotheses will be tested using the data obtained from the structured questionnaire, namely:

#### The first hypothesis:

H<sub>0</sub>: The technology small and medium enterprise entrepreneurs are dispassionate in attitude towards public venture programmes.

H<sub>a</sub>: The technology small and medium enterprise entrepreneurs have a positive attitude towards public venture capital programmes.

#### The second hypothesis:

H<sub>0</sub>: The technology small and medium enterprise entrepreneurs are indecisive in their expectations of the barriers that exist in the industrial environment.

H<sub>a</sub>: The technology small and medium enterprise entrepreneurs are decisive in their expectations of the barriers that exist in the industrial environment.

The open-ended interviews were intended to obtain a general impression from the 10 interviews on their:

- Experiences of the major problems experienced by high technology firms to access venture capital;
- Identification of the single most helping factor in the public venture capital system that will enable high technology enterprises to finance their activities;
- Learning experiences in the venture capital industry in developed countries that could be transferred to developing countries.

- Main considerations when high technology enterprises apply for government financial support?
- Opinions regarding the Chinese Government’s programme to provide public venture capital to support the growth of high technology enterprises;
- Opinions whether public venture capital will eventually push out private venture capital investment activities;
- Preferences if they could chose freely between public venture capital and private professional venture capital investment;
- Understanding of the principal difference between public venture capital and other forms of private equity venture capital; and
- Views about the principal obstacles or problems experienced by entrepreneurs in the Chinese venture capital market;

It is important to indicate that the analysis was done according to the “Triple Helix” model (Etzkowitz & Loet, 1997) and according to the “Agency Theory” (Jensen & Meckling, 1976). These two analyses methods were used to justify the necessity for government venture capital support and intervention in developing countries, and address the first research question. To answer the second research question, the researchers developed an “Arrow Pattern” that outlines a possible policy to guide government programmes and actions in the venture capital industry. The development of an “Arrow Pattern” was done in conjunction with a comprehensive secondary literature data analysis (Figure 3).

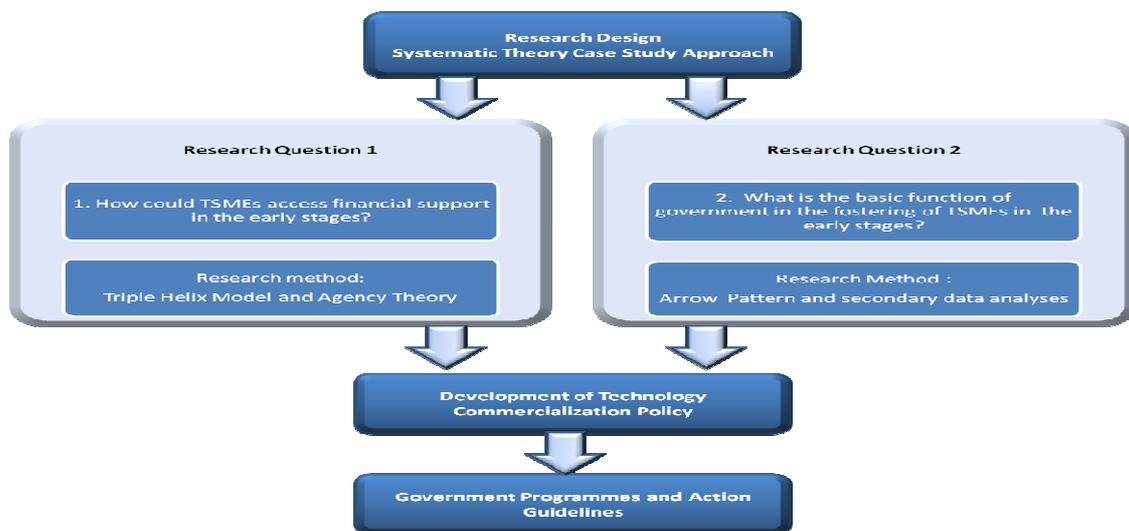


FIGURE 3: Research design and method

## Opinions held by surveyed technology small and medium enterprise entrepreneurs

### *Sample description*

Of the 30 subjects selected to participate in the study, only 25 entrepreneurs demonstrated a willingness to participate in the questionnaire survey research. The remaining 5 selected subjects were excluded from the research after numerous participating requests by e-mail and telephone. It was assumed that these subjects were not willing or motivated to participate in

the research. Further to the questionnaires, a total of 10 telephonic interviews were conducted. Figure 4 gives an indication of the composition of the questionnaire surveyed respondents participating in the research, whilst Figure 5 gives an indication of the respondents participating in the interviews.

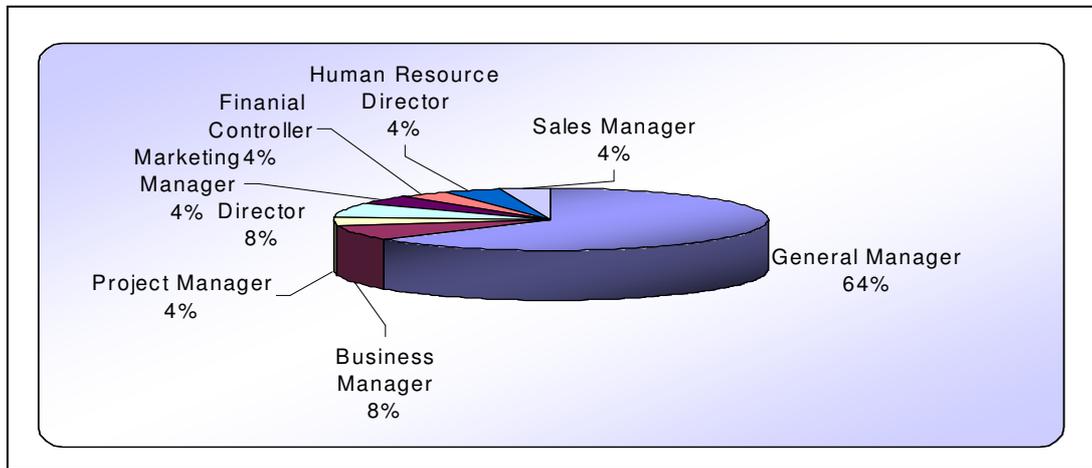


FIGURE 4: Composition of survey respondents in enterprises (n=25)

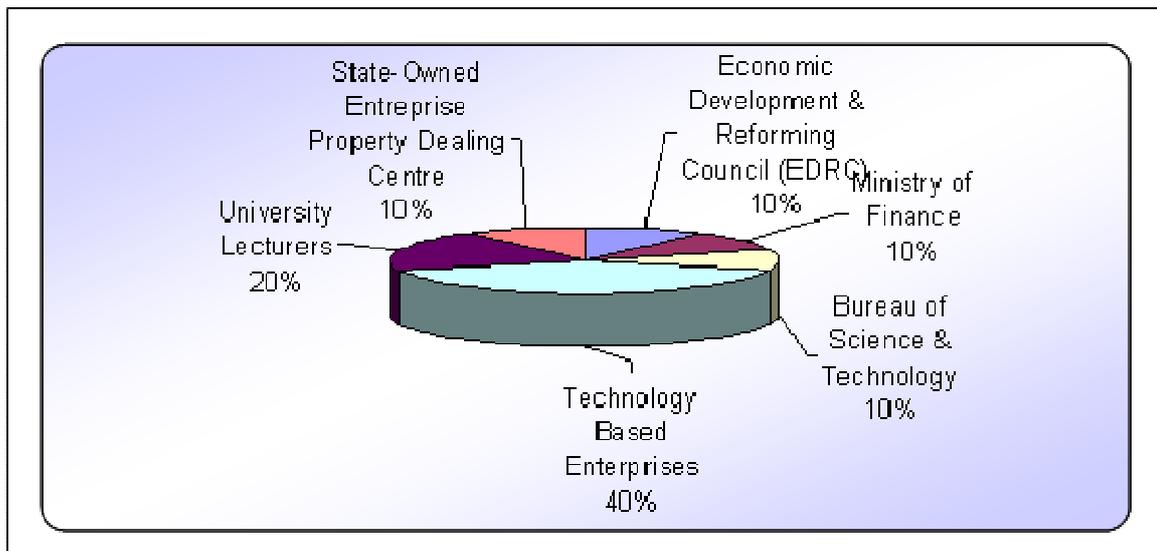


FIGURE 5: Composition of interview respondents in enterprises?

A more detailed profile description of the high technology small and medium enterprises participating in the questionnaire survey is described in Table 1. A total of 25 enterprises participated in the survey research.

TABLE 1: Enterprise profile description of high technology small and medium enterprises

| Business Activity   | Product Classification                         | Economic Sector                            | Business Phase          | Employees               |          |               |             | Total     |   |   |
|---|--|--|-------------------------|-------------------------|----------|---------------|-------------|-----------|---|---|
|   |  |  |                         | Less than 100           | 101-300  | 301-500       | 501 or more |           |   |   |
| Logistics Provider (N=1)  | Rail, road & transport equipment (N=1)         | Real estate, renting & business activities | Expansion stage         |                         |          | 1             |             | 1         |   |   |
| Manufacturer (To multiply finished products using various processes, machines and energy) (N=7) | Pharmaceuticals (N=1)                          | Manufacturing                              | Stock exchange listed   |                         | 1        |               |             | 1         |   |   |
|   | Radio, TV & communication equipment (N=1)      | Manufacturing                              | Stock exchange listed   |                         |          |               | 1           | 1         |   |   |
|   | Electrical machinery & apparatus (N=1)         | Manufacturing                              | Expansion stage         |                         | 1        |               |             | 1         |   |   |
|   | Chemicals excluding pharmaceuticals (N=1)      | Manufacturing                              | Buy-out stage           |                         |          |               | 1           | 1         |   |   |
|   | Machinery & equipment (N=3)                    | Manufacturing                              | Phase Buy-out stage     |                         |          |               | 1           | 1         |   |   |
|   |  |  |                         | Stock exchange listed   |          |               |             | 2         | 2 |   |
|   |  |  |                         |                         |          |               |             | 2         | 2 |   |
| Producer (To create something i.e. converts inputs into outputs) (N=13)                         | Pharmaceuticals (N=2)                          | Manufacturing                              | Stock exchange listed   |                         |          |               | 2           | 2         |   |   |
|   | Radio, TV & communication equipment (N=1)      | Manufacturing                              | Early development stage |                         |          | 1             |             | 1         |   |   |
|   | Electrical machinery & apparatus (N=1)         | Manufacturing                              | Expansion stage         |                         |          | 1             |             | 1         |   |   |
|   | Chemicals excluding pharmaceuticals (N=4)      | Manufacturing                              | Phase                   | Early development stage |          | 1             | 0           | 0         | 1 |   |
|   |  |  |                         | Expansion stage         |          | 0             | 1           | 0         | 1 |   |
|   |  |  |                         | Stock exchange listed   |          | 0             | 0           | 2         | 2 |   |
|   | Basic metals & fabricated metal products (N=2) | Manufacturing                              | Phase                   | Start-up stage          |          | 1             |             |           | 1 |   |
|   |  |  |                         | Buy-out stage           |          | 1             |             |           | 1 |   |
|   | Food products, beverages & tobacco (N=3)       | Manufacturing                              | Early development stage |                         | 1        |               |             |           | 1 |   |
|   |  |  |                         | Health & social work    | Phase    | Buy-out stage |             |           |   | 1 |
| Stock exchange listed   |  |  |                         |                         |          |               |             |           | 1 | 1 |
| Research & academic (N=1)   | Office, accounting & computing machinery (N=1) | Agriculture, hunting & forestry            | Early development stage | 1                       |          |               |             | 1         |   |   |
| Service centre (N=1)  | Radio, TV & communication equipment (N=1)      | Transport, storage & communications        | Early development stage | 1                       |          |               |             | 1         |   |   |
| Technology provider (N=1)   | Office, accounting & computing machinery (N=1) | Transport, storage & communications        | Early development stage | 1                       |          |               |             | 1         |   |   |
| Trader (N=1)  | Other non-metallic mineral products (N=1)      | Wholesale & retail trade                   | Early development stage |                         | 1        |               |             | 1         |   |   |
| <b>Total</b>  |  |  |                         | <b>4</b>                | <b>6</b> | <b>4</b>      | <b>11</b>   | <b>25</b> |   |   |

### Quantitative data analysis of the survey

The first analysis intended to test the hypothesis on whether technology small and medium enterprise entrepreneurs are dispassionate in attitude towards public venture programmes. A total of five questions were posed to test this hypothesis, one question tested by the binominal test, whilst the remaining four questions will be tested by means of the chi-square ( $\chi^2$ ) test. The findings are presented in Tables 2 and 3.

Tables 2 and 3 provide partial support for rejection of  $H_0$  on two of the five questions posed thus revealing that high technology small and medium enterprise entrepreneurs are indeed passionate in attitude about some aspects of public venture capital. In the first place, the majority was motivated to apply for and to receive some form of public venture capital (Table 2). The respondents also consider the help provided by existing public venture capital as having a helpful effect on their enterprises. However, it seems that the entrepreneurs were dispassionate in attitude about participating in public venture capital programmes for the use of technology and innovation, the kind of venture capital receiving and whether the Chinese Government's promotion on the use of technology will indeed help their enterprises to excel (Table 3).

TABLE 2: Bi-nominal test for making use of public venture capital support

| Item Description                             | Response | N  | Observed Prop. | Test Prop. | Exact Sig. (2-tailed) | Point Probability |
|--|----------|----|----------------|------------|-----------------------|-------------------|
| Q10: Public Venture Capital Support Received | Yes      | 23 | .92            | .50        | 0.0000**              | 0.0000**          |
|  | No       | 2  | .08            |            |                       |                   |
|  | Total    | 25 | 1.00           |            |                       |                   |

TABLE 3: Opinions on public venture capital

|            | Kind of Support | Interest | Helpfulness | Technology Promotion |
|------------|-----------------|----------|-------------|----------------------|
| Chi-Square | 6.286           | 4.880    | 13.520      | 4.750                |
| df         | 4               | 2        | 2           | 2                    |
| Sig.       | .120            | .160     | .000        | .200                 |

Possible reasons to explain this phenomenon can be deduced. It seems that these enterprises are willing to take any kind of support from the Chinese government to enhance and empower their enterprises and to demonstrate their credibility in the business environment. Another possible explanation is also that any form of government financial support aligned with the policy framework of the country, serves as a confidence boosting instrument indicating to the enterprise that it is moving in the right direction. It can furthermore be speculated that any kind of support by a government, could be used as a form of security to raise further capital.

This result is not surprising as the reputability of a government evaluation and support in China for an investment, supported by the Chinese government, is a strong motivation to local governments and financial institutions to support such ventures. This type of trust in the transferability of the kind of support can only be attributed to the highly structured nature of the planned economic system that exists in China. Any form of support by a higher hierarchy in the Chinese culture, create a perception of trust in the mind of customers and investors. Despite the fact that no preferred public venture capital support could be identified, Figure 6 provides an indication of the most received public venture capital support programmes by the participating high technology small and medium enterprises.

From these results it appears that that the most popular forms of public venture capital support programmes in descending order is: debt finance, free finance, preferential taxation treatment, guarantees and equity investment. Because of the small sample size, no conclusive conclusion could be deduced. However, one may deduct that the government may prefer to provide support of a kind, like debt finance, that demands some form of responsibility and risk from technology small and medium enterprises instead of providing free handout support that does not create a challenge or obligation to enterprises.

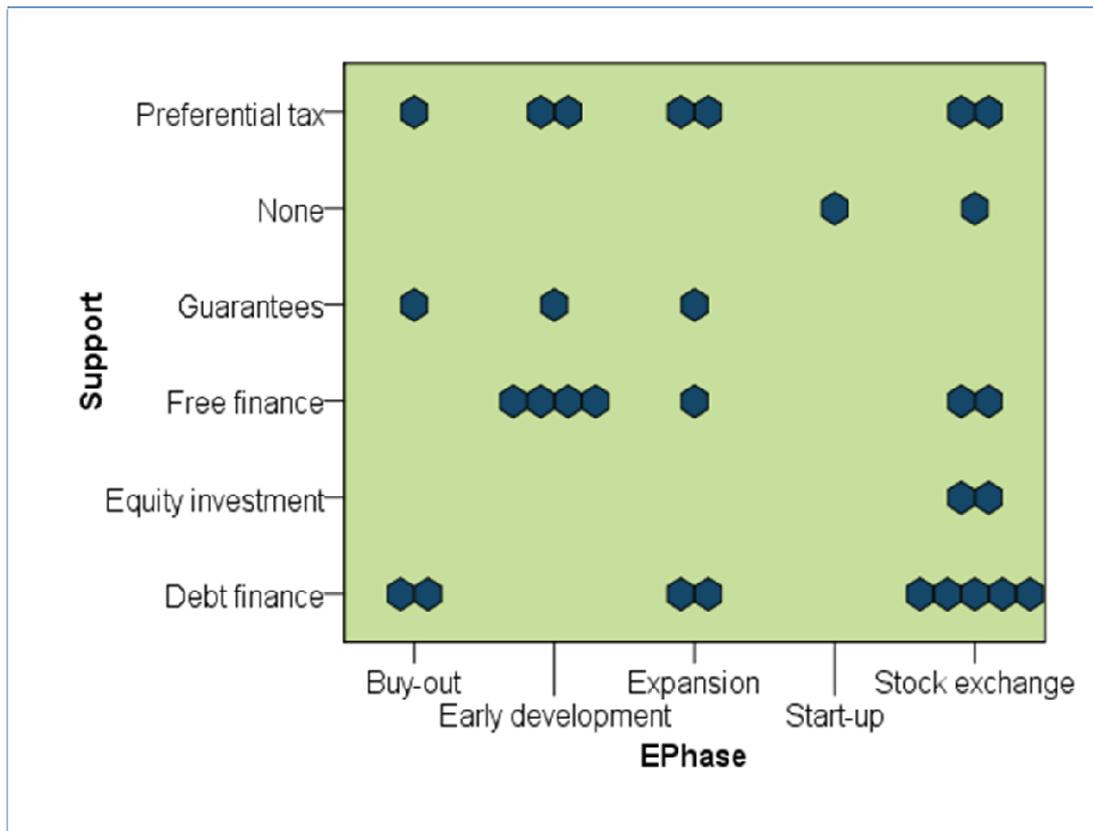


FIGURE 6: Most received public venture capital support programmes

The second analysis intends to test the hypothesis that technology small and medium enterprise entrepreneurs are indecisive in their expectations of the barriers that exist in the industrial environment.

Table 4 reveals that  $H_0$  should be partially accepted to indicate that high technology small and medium enterprise entrepreneurs are indecisive in their expectations of the barriers that exist in the industrial environment. The smaller the  $\chi^2$ -values, the greater the chance that differences between the reported responses (observed) and the expected responses can be contributed to chance and not because of decisive responses.

A possible reason for the indecisiveness of the above items, may be that the respondents did not have sufficient information on items posed to them as all the above questions relates to barriers in the industrial environment that are not enterprise specific. Whilst, the items in which significant differences occurred leading to the rejection of the  $H_0$  (Table 5) relates directly to enterprise specific issues or were directly experienced by the enterprise, enabling them to express an opinion.

TABLE 4: Items in which the  $H_0$  is accepted

| Item  | Test Statistic          |    |            |
|---|-------------------------|----|------------|
|   | chi-square ( $\chi^2$ ) | df | Exact sig. |
| The Chinese Government procure insufficient amounts of high technology products       | 1.0400                  | 2  | 0.6750     |
| Enterprises has not yet become the backbone of research and development investment in | 1.0400                  | 2  | 0.6750     |
| High technology enterprises need more support to succeed in the external environment  | 1.5200                  | 2  | 0.5050     |
| Regulation of intellectual property is not sufficient                                 | 2.0000                  | 2  | 0.4100     |
| registration fees in is too high  | 3.9200                  | 2  | 0.1700     |
| Competition from overseas high technology enterprises is high                         | 4.2800                  | 3  | 0.2460     |
| My enterprise is short of professional employees                                      | 4.6000                  | 3  | 0.2120     |
| There is a legal lack of protecting investment in research and development            | 5.3330                  | 3  | 0.1520     |
| My enterprise lacks a management system to protect intellectual property rights       | 6.2000                  | 3  | 0.1060     |

TABLE 5: Items on which the  $H_0$  is rejected

| Item  | Test Statistic          |    |            |
|---|-------------------------|----|------------|
|   | chi-square ( $\chi^2$ ) | df | Exact sig. |
| I expect that government finance can support my enterprise in future  | 22.5200                 | 3  | 0.0000     |
| Government as public venture capitalist plays an important role in fostering high technology enterprises              | 11.2000                 | 4  | 0.0240     |
| Great obstacles are experienced in the international marketing of high technology products                            | 11.0000                 | 3  | 0.0110     |
| The value-added tax (VAT) on technology based enterprises in is heavy   | 11.0000                 | 3  | 0.0110     |
| Research and development investment in represents a too low percentage of the GDP                                     | 9.9200                  | 2  | 0.0070     |
| The transparency of public venture capital for high technology enterprises is low                                     | 9.3330                  | 3  | 0.0220     |
| The taxation policy and regulation in is unstable and imperfect   | 8.7600                  | 3  | 0.0320     |
| I believe that the Chinese Government can provide stronger protection of high technology intellectual property rights | 8.3330                  | 3  | 0.0450     |
| The accessibility of professional private equity venture capital is difficult to obtain in                            | 8.1200                  | 3  | 0.0410     |
| The equity market in is not mature  | 8.1200                  | 3  | 0.0410     |
| Preferential taxation treatment of high technology enterprises in is not sufficient                                   | 7.2800                  | 2  | 0.0300     |
| Company registration procedures in is too complex   | 6.3200                  | 2  | 0.0410     |

Another reason for the indecisiveness may be that if one assumes that the respondents did have sufficient information to interpret the above questions, then it may imply that insufficient consensus exist amongst respondents on the barriers that exist in the industrial environment and that some respondents consider the barriers in the industrial environment as not too challenging to overcome whilst others may experience some difficulties to overcome these barriers. Nevertheless, it cannot be concluded that the above barriers are conducive for conducting business in high technology small and medium enterprises.

Table 5 provides clear evidence on the decisiveness of entrepreneurs in high technology small and medium enterprises of barriers that exist in the industrial environment that demands intervention.

It can be synthesized that government has a definite role to play to support high technology small and medium enterprises, especially with regards to the promotion of high technology products, filling the financial gap by means of public venture capital programmes, and through good regulatory policies like the taxation policy, protection of intellectual property rights, policy transparency procedures, and simplification of venture capital provision procedures. A strategy is also required to ensure proper investment by the government in research and innovation for high technology small and medium enterprises. The support role of government through public venture capital programmes is therefore sufficiently proven by Table 5, whilst speculative suggestions for support were provided by Table 4.

### ***The major problems experienced by high technology enterprises to access venture capital***

The respondents have identified three major problems experienced by high technology enterprises trying to access venture capital namely:

- The financing channel for technology enterprises are limited in terms of numbers as well as too limited information exist to discover and identify venture capitalists in the market;
- Public venture capital is the principal aim of technology enterprises seeking venture capital resulting in an under emphasis of other sources of venture capital and an over demand for public venture capital; and
- Unless high technology enterprises have well-developed management teams they may experience huge problems to convince venture capitalists to provide venture capital to overcome the financial gap.

### **The role of government according to ‘Triple Helix’ model**

The ‘Triple Helix’ model (Figure 7) represents a new perspective in modern innovation theory, expressing the interactive relationship between the university- industry-government, it is considered to be the key to improve the conditions for innovation in a knowledge-based society (Etzkowitz & Loet, 1997).

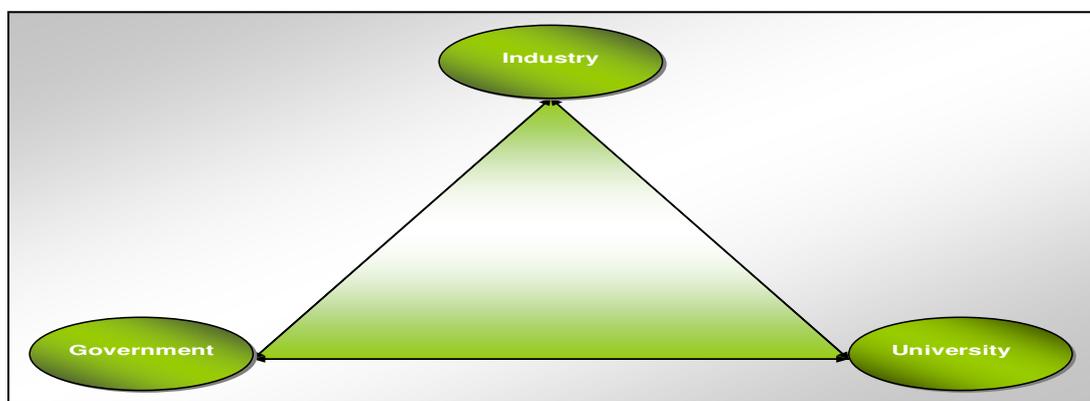


FIGURE 7: The Triple Helix Model (Etzkowitz & Loet, 1997:14-19)

Figure 8 provides a more detailed content on the role of each member belonging to the Triple Helix model in terms of interaction circles.

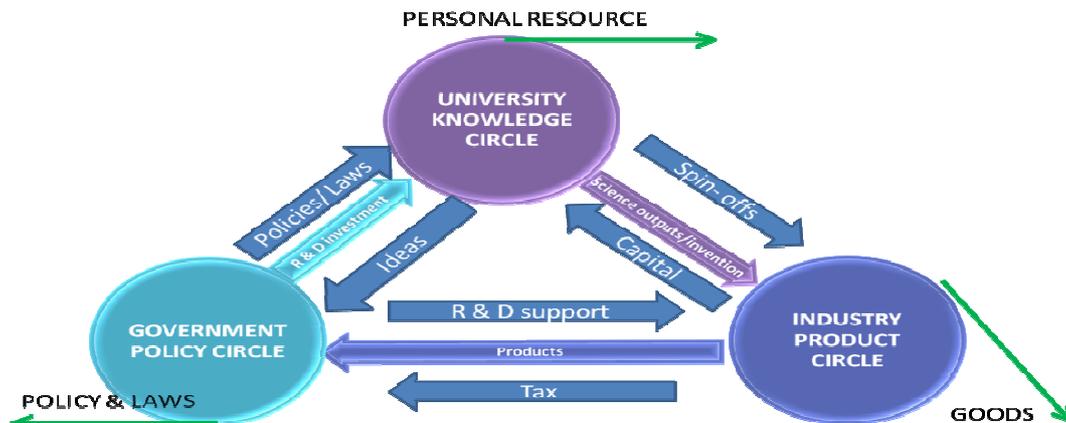


FIGURE 8: Triple Helix-field interaction circles (Etzkowitz & Zhou, 2006)

Figure 8 is showing the innovation process in university and industry, through the formulation of policies, enacting laws, direct investment or indirectly encouraging (venture) investment, government stock, as well as promoting high technology small and medium sized enterprises (TMSEs). Strauss (2001) for example has systematically examined the role of government activity in the economic growth of 64 industrialized and developing countries, considering both the expenditure and financing aspects of government. Strauss's examination concluded that the role of *good* government is important, especially in developing countries, where government action falls into three broad categories. Firstly, the government can have a creative function. Secondly, government policies such as tax policies and regulations of venture investment, directly affect the venture capital industry. Thirdly, laws and regulations governing pension funds, stock markets, labour markets, patents, as well as other areas; affect the venture capital industry indirectly. Hellmann (2000) supported these conclusions and derived five institutional forces that affect the vitality of the venture capital industry of a country (Figure 9).

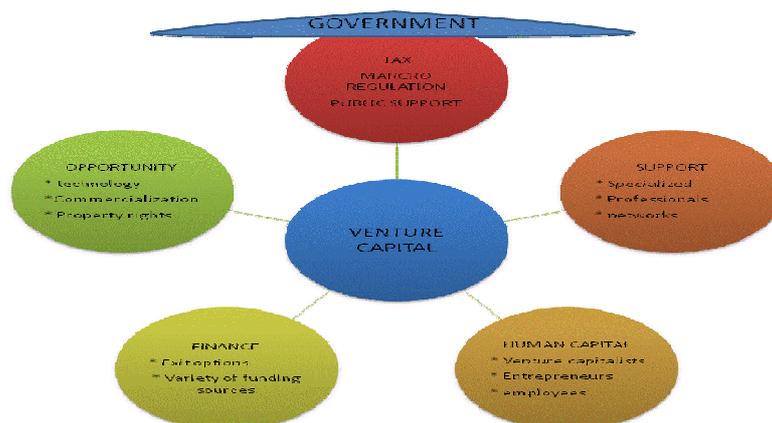


FIGURE 9: The five institutional forces that affect the vitality of the venture capital industry (Source: Hellmann, 2000: 2)

### Examples of venture capital models to support high technology enterprises in China

In Suzhou (an eastern coast city in China), 75% of science parks are supported by municipal

public venture capital (Qing & Zhu, 2006). A special institute was established for the purpose of administering the science parks on behalf of Suzhou municipality. This institute is directly and indirectly responsible to the Local Science Committee of the central Chinese government. The government directly recruits and trains the employees for the institute. The operational capital of the institute is derived partly from the rental and service charges accrued from incubated TSMEs and partly from fiscal revenues. In return the science parks in Suzhou city provide lower rent and various free services for enterprises and are therefore non-profit seeking institutes. The Suzhou municipality provides direct subsidies from fiscal revenues (Figure 10).

**Model 1: Government’s direct involvement in high technology enterprises as applied in Suzhou city**

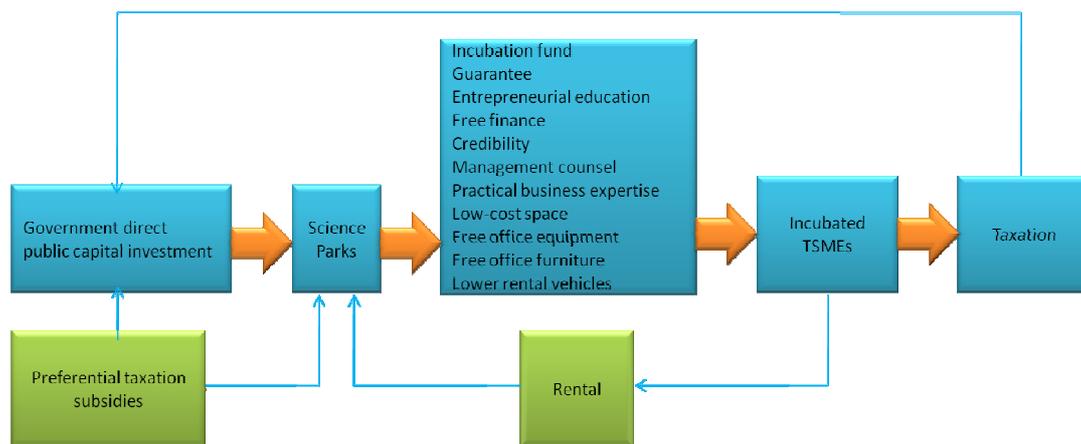


FIGURE 10: Model 1 - Government’s direct involvement in high technology enterprises

**Model 2: The state-owned enterprise (SOE) participation model**

In this model, SOEs form a co-investment with private equity enterprises to invest in particular science and technology projects. In this position, SOEs act as a government agency in the venture capital industry. These SOEs often have preferential access to the social and economic resources of a country. Having a SOE as a venture capital investor can afford an enterprise extra benefits, such as government finance, products ordering by government, managerial skills, reputation enhancement, and improved networks. Figure 11 depicts this model in more detail.

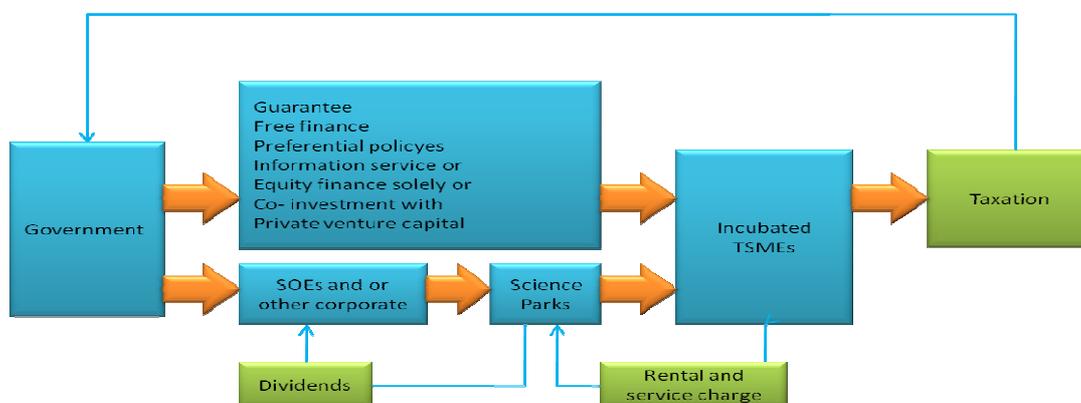


FIGURE 11: Model 2 - State owned enterprise participation model

**Model 3: Research institutes as venture capitalists**

In China, various public research institutes and universities have established science parks, such as: Fudan University, Tshing Hua University, and the Chinese Academy of Sciences Institute. These research institutes and universities have attracted numerous high technology enterprises and located them in science parks. Their investments rigorously tend to focus on commercializing the scientific research outputs (Figure 12). These entrepreneurs include students, professors, and administration staff. Such science parks operations often seem like an entrepreneurial university. The Triple Helix model describes the university-industry-government relationship and this way of thinking has become a historical legacy in China (Etzkowitz & Zhou, 2006).

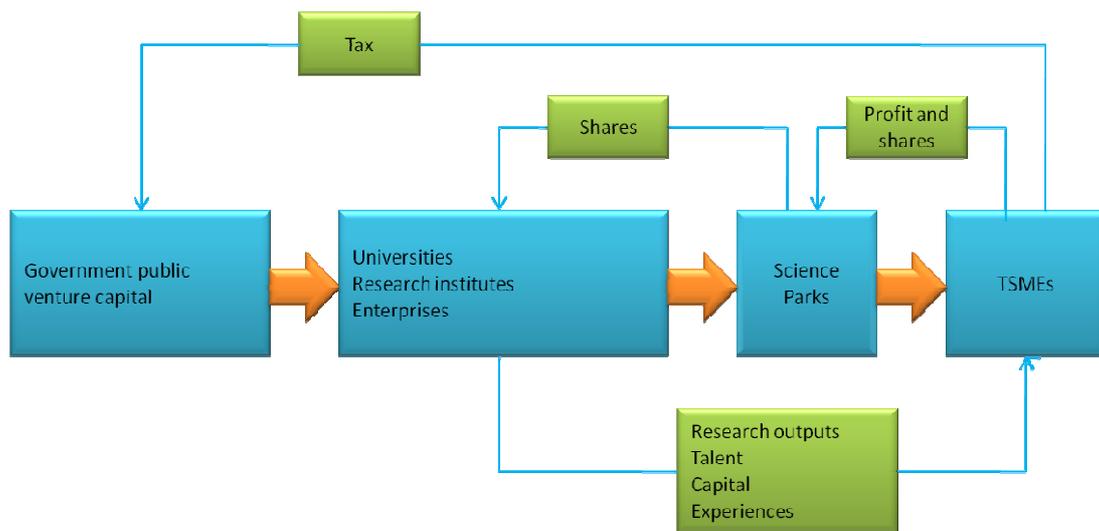


FIGURE 12: Model 3 - Research institutes as venture capitalist

**Integration and Interpretation**

The examples from both the developed world and from China, representing a developing country, clearly demonstrated the need of government intervention by means of policy regulatory systems, its legal system and financial institutions. The main difference is the degree of involvement and dimension in promoting the venture capital industrial and the manner in which government’s become directly or indirectly involved in supporting high technology small and medium sized enterprises. The depth of government involvement is dependent on various factors; amongst the cultural environment, historical background, the national strategy, and the economic development status of a country. Even though this represents a complicated problem to differentiate the effects of these influences, it can in general be concluded that a government’s role in the venture capital industry can be described as reflected in the arrow model presented in Figure 13.

This arrow pattern summarizes the common influencing factors in developing and developed countries are summarized. Arrow line “D” divides the fundamental base of the arrow pattern into two components, A and B, as indicated in Figure 13. A and B are showing the different characteristics of developing countries and its counterpart, developed countries. Portion “A” represents the developing countries and portion “B” developed countries. In order to support high technology enterprises, portion “A” countries (developing countries) have to be more directly involved in the venture capital industry. The reason being, that these governments

are faced with a more undeveloped financial market. This further implies that these governments need to develop operational regulations, a proper legal system and a venture equity market in order to overcome the scarcity of venture capital.

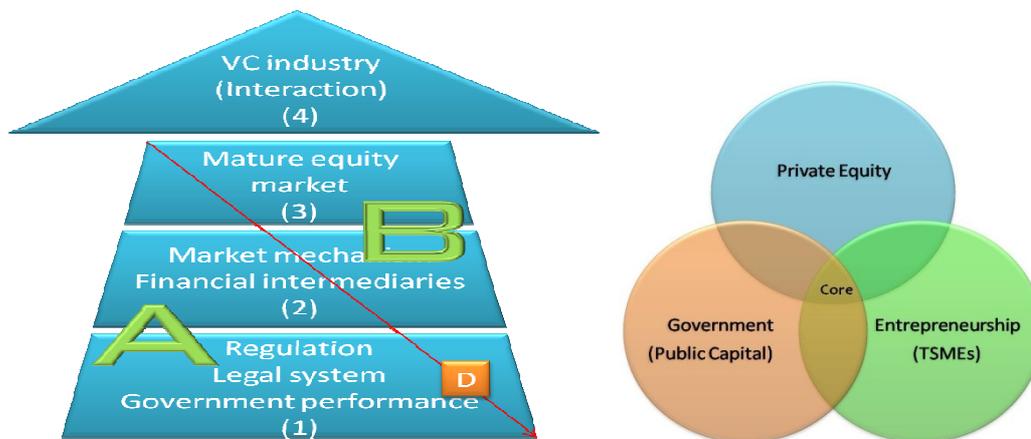


FIGURE 13: The variety of government roles in developing and developed countries, and its interaction in the venture capital industry

The above also provides reason why governments in developing countries choose to directly invest and provide free finance for high technology enterprises, whilst still in the early stages. Due to this situation, agency problems and possible crowding out of private venture capital investors are not seriously considered in the early promotion stage of the venture capital industry. The first task of these governments is to catalyze public sources and other private sources into industrial growth, and to balance the geographical and industrial distribution of venture capital. Figure 13 indicates that governments in developing countries will have to work hard to reinforce the foundation of venture capital in terms of building blocks 1 (policy regulations, legal system and government performance), 2 (market mechanisms and financial intermediaries), and 3 (development of equity market), in this sequence.

In contrast, governments in developed countries operating in Portion “B” of the arrow pattern will spend more time to establish an effective equity market, like some European countries have already done and continue to perfect and expand equity options for high technology small and medium sized enterprises. In the ideal mature equity market complete interaction and good relationships will be established between the government, entrepreneurs and knowledge generation institutions which will also interact in the venture capital industry. In the ideal developed industrial environment, a mature equity market exists, with excellent government performance and active entrepreneurship, and research and development activities to create the ideal conditions for fostering high-technology innovation, and a conducive high-technology enterprises support system in a country.

In conclusion, if an imperfect interaction is derived from the asymmetric intensity of the three relationship spheres, in which one participant is too strong or too weak, an ideal result will never be reached. Based upon this understanding, the researchers are of the opinion that this could be a reason why so many controversies have arisen around government’s role in the venture capital industry, even around all market issues in a country’s economic growth.

## Conclusion

As a developing country moves towards becoming a developed country its role in the public

venture capital system will gradually change from being a direct participant and supporter in the market environment to being a service provider in the market environment. Government's public capital support includes free finance, an interest-free loan, guarantee, preferential taxation, incubator, other indirect support such as policy, regulation support, network service and a free information service are also very important for high-technology enterprises. The implementation of such favourable measures is crucial in developing countries.

The research has probed the government role played in the market environment, and how to maximize the effectiveness of public venture capital, with the minimum possible distortion of the market mechanism. This dilemma concerning government's behaviour is actually an essential debate in the field of economics. This classical controversy debated around the market mechanism and government intervention, exists between Neoclassical economics and Keynesian economics.

Nevertheless, government's participation is always a positive force for high-technology enterprises in a developing country, especially for those technology-based enterprises in infancy, and such participation provides for practical needs according to the actual legal and market environment in developing countries. The significance of this research was intended to answer the question of how government can be good public venture capitalist in assisting high-technology enterprises as well as incubating the innovative business environment in order to promote economic growth.

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