

Research on the Role Mechanism of the Government to Promote Investment in Start-ups by Venture Capital

Wan-Li MA^{a,*}, Hao WU^b

College of Economics and Management, China Jiliang University
Hangzhou 310018, China

mawlrq@126.com

Keywords: Venture capital, Investment intention, Role mechanism, Technology-organization-environment theory.

Abstract. At present, the number of investment items and the proportion of the amount of investment in China's venture capital investment to the start-ups are not high, which not only inhibits the enthusiasm of early entrepreneurial activities, but also weakens the cultivation function of venture capital for start-ups. How the government should promote the venture capital enterprises to invest in start-ups has become an important issue in the research of venture capital. Based on the technology-organization-environment theory, this paper constructs the conceptual model. Through the questionnaire survey of venture capital institutions in Zhejiang, Shanghai and Beijing, we carry out calculation and analysis of structural equation model with smartPLS, and verify the hypothesis. The result shows that the government has a positive impact on venture capital's investment intentions by affecting investment funds in the current period of venture capital investment and constructing the information platform.

Introduction

China's venture capital began from the 1980s. After nearly 30 years, it has made rapid development. But in recent years, a notable problem is that our venture capital institutions still favor the enterprises at the growth stage. The number of projects and the ratio of the amount of investment to start-ups are still not high, which greatly inhibits the initiative of early entrepreneurial activities. Under the background of innovation driven development in China, it is imminent to guide domestic venture capital institutions to invest in start-ups. Can the government have a certain impact on venture capital institutions to invest start-ups? How does the government play the role? What is the relationship between these factors? Answering these questions will help the venture capital institutions to increase their investment in start-ups, which is of great practical significance to the realization of innovation driven development.

As for the problem that government promotes venture capital institutions to invest in start-ups, some researches at home and abroad show that "government promotion" is a key factor for the external driving force for venture capital institutions to invest in start-ups. And the existing research mainly explains it from two aspects: one is the role of the government and the other is the policy of the government. Regarding the role of the government, Song Li and others (2013) think that the government should play a leading role on the basis of marketization and create the favorable environment for the development of venture capital industry, equipped with the platform for the communication between venture capital institutions and start-ups; Jiang Yingming (2004) believes that strengthening the legislation can better promote investment institutions to invest in start-ups. The issue of government policy is mainly reflected in the aspects of finance and taxation. For example, Yin Ruizhe (2009) and XueWenli and others (2007) put forward that the government can attract private capital into venture capital industry by setting up venture capital guiding funds; the government can also use the way of risk compensation to encourage venture capital to invest in start-ups. Song Li and others (2013), Rin and others (2006) have found that the reduction of capital gains tax rate can obviously improve the initiative of venture capitalists to invest in start-ups.

However, most of these studies have not yet explored how the government promotes venture capital institutions to invest in start-ups, especially they are lack of quantitative research on the government's role in investment in start-ups by venture capital institutions and their relationship. This is an important theoretical basis for evaluating the effectiveness of the policy of promoting venture capital to invest in start-ups. Therefore, it is urgent to theoretically expand the government's role in investment in start-ups by venture capital institutions.

Model and Research Hypothesis

Construction of Conceptual Model

Tornatzky and Fleisher (1990) first put forward the theory of Technology-Organization-Environment, TOE, in the *Technology Innovation Process*. The theory analyzes the influence of technology, organization and environment on the decision making of enterprises, which is initially used to explain the technology integration and adoption behavior of organizations. It has been rapidly developed because it collects multiple considerations and has the characteristics of high integrity and ductility for research proposition (Y Wang, H Lin, L Pin, 2006), and it has been widely used by domestic and foreign scholars in the research on the internal innovation of enterprises, electronic commerce field and so on. It is worth noting that, in the study of investment intentions of venture capital institutions, because venture investment is of high risk, complexity and other characteristics, both the factors of venture capital institutions and the external environment, especially the influence of government policy on investment intention of venture capital institutions, should be considered in the study; therefore, this paper tries to apply the TOE theory to the research of government promotion mechanism.

Based on TOE theory, combined with literature research, expert interviews and the actual operation of venture capital institutions, from the perspective of influence of investment intention of venture capital institutions, we will research the mechanism of government in promoting venture capital institutions to invest in start-ups from the following aspects. Firstly, variables that reflect technological characteristics, mainly referring to the construction of information platforms within venture capital institutions, including the integration of sources, channels and ways for venture capital institutions to obtain items; secondly, the variables that reflect the characteristics of organization, including the current investment funds of the venture capital institutions and the expected performance of the investment; thirdly, the variable that reflects the characteristics of environment, mainly referring to the government's behavior and policy. Based on the TOE theory, the conceptual model is presented, as shown in Figure 1.

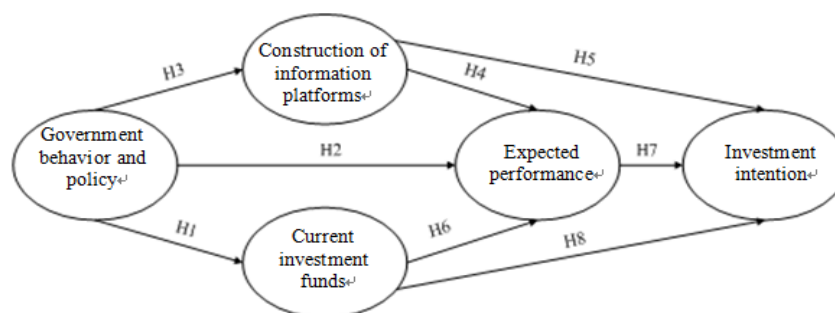


Fig. 1. Conceptual model of this paper

Presentation of Research Hypothesis

Based on the conceptual model and the relevant literature research results, the following research hypothesis is proposed.

1. Research hypothesis on government behavior and policy and investment funds of venture capital

Astrid Romain (2003) believes that the actual significance of “government assistance” is the government’s contribution to support and encourage the development of venture capital. Liu Ruixiang and Chen Senfa (2007), by studying the industry data, proves that appropriate subsidies and tax preferences to venture capital institutions by the government can promote venture capital institutions to invest in start-ups and improve project survival rate. Zhang Luyang and Xiao Jian (2008) believe that the government can give a certain degree of fund support to the venture capital institutions by guiding funds, direct investment or partnership.

According to the above analysis, the following hypotheses are put forward.

H1: Government behavior and policy have a positive impact on the current investment funds of the venture capital.

2. Research hypothesis on government behavior & policy and the expected performance of venture capital

Through empirical research, Brander (2010) and Leslie A Jeng (1999) show that government policies can have a significant impact on the operation of venture capital. Especially in the face of risk factors, to a certain extent, they can enhance compression ability, thus the venture capital have better investment performance. According to the above analysis, the following hypotheses are put forward.

H2: Government behavior and policy have a positive impact on the expected performance of venture capital investment.

3. Research hypothesis on government behavior & policy and construction of information platforms for venture capital

Song Huajing (2010) thinks that the policy of government appropriation to support research and development of universities and enterprises will generate more new projects. The database formed by these new projects is an important source of project information for venture capital institutions.

According to the above analysis, the following hypotheses are put forward:

H3: Government behavior and policy have a positive impact on the construction of the information platform of the venture capital.

4. Research hypothesis on information platforms and expected performance

Yao Xianguo (2008) and CHEVALLIER (2009), through studying the relationship between the expected performance of investment projects and the internal information channels of venture capital institutions, have found that the richer the source of information is, the better the quality of investment projects is; the more ideal investment expectancy performance can be achieved.

According to the above analysis, the following hypotheses are put forward.

H4: The construction of the information platform of the venture capital has a positive impact on its performance expectations.

5. Research hypothesis on information platforms and investment intention

Dirk (1998) and Gompers Lerne (1999) believes that the more information the venture capital masters, the more accurately it can judge the investment efficiency of the project, the more confident it will be, the more willing it will be to make the investment decision.

According to the above analysis, the following hypotheses are put forward.

H5: The construction of the information platform of the venture capital has a positive impact on its investment intention.

6. Research hypothesis on venture capital investment funds and the expected investment performance

Through study, Josh Lemer (2000) and Yang Qing (2012) conclude that the capital status of venture capital institutions is related to their decision-making and investment performance. The more investment funds that venture capital institutions get, the stronger desire for investment venture capital institutions will have, the more investment projects there will be, and the smaller investment risk will be, the better the expected performance will be.

According to the above analysis, the following hypotheses are put forward.

H6: The current investment funds have a positive impact on the expected performance of the venture capital.

7. Research hypothesis on expected performance and investment intention

Through study, Wang Zhenshan (2010), Franke and others (2012) have found that better expected performance portfolios tend to gain more investment opportunities. According to the above analysis, the following hypotheses are put forward.

H7: The expected performance has a positive impact on the investment intention of the venture capital institutions.

8. Research hypothesis on investment funds and investment intention

Through empirical research, Aernoudt (2003) and Josh Lemer (1999) study the relationship between investment funds obtained by venture capital institutions and the number of investment projects in small business innovation projects in America, and have found that the more investment funds venture capital institutions obtain, the stronger desire to invest the venture capital institutions will have.

According to the above analysis, the following hypotheses are put forward:

H8: The investment funds in the current period have a positive impact on the investment intention of the venture capital institutions.

Empirical Research

Questionnaire Design

The questionnaire is divided into two parts. The first part describes the measurement of structural variables corresponding items in the paper, including the measurement items of “government behavior and policy” adapted from L Cui, C Zhang, L Huang (2008), the measurement items of the “current investment funds” adapted from Y Wang, H Lin and L Pin (2006), the measurement items of “information platform construction” adapted from Liang, Ting-Peng, Huang, Chen-Wei, Yeh, Yi-Hsuan, et al. (1980), the measurement items of “expected performance” adapted from Kevin K. Y. Kuan (2001) and the measurement items of “investment intentions” adapted from Venkatesh V, Morris M G, Davis G B, et al (2003). The measurement criteria for all variables are based on the Likert seven-point scale, in which 1~7 represent the choice of seven equal variations from “complete disagreement” to “complete agreement”. The second part of the questionnaire is overview of the venture capital institutions. Before the formal investigation, first 15 executives and investment managers from venture capital institutions are invited to participate in the questionnaire pretest, proposal on wording of questionnaire, length of questions in questionnaire and questionnaire format are collected, and the questionnaire is modified to lay a good foundation for the formal questionnaire. The design of the measurement items in the questionnaire is shown in Appendix A of the questionnaire.

Appendix A. Measurement Items of Observed Variables.

Dimensions	Questions	Source
Expected performance	1. I think the expected investment returns of the start-ups are high.	Kevin K. Y. Kuan and Patrick Y.K. Chau (2000)
	2. I think investing in the start-ups can improve the image of the company.	
	3. I think investing in the start-up can improve the competitive advantage of the company.	
	4. I think investing in the start-up can help the company in other investment practices.	
	5. I think investing in the start-up can improve the company's relationship with other investment partners.	
Current investment funds	1. I think investing in the start-up does not constitute an obstacle to the company's funds.	Y Wang, H Lin and L Pin (2006)
	2. I think that investing in the product / technology of the start-up will help the company obtain better investment results.	
	3. The start-ups provide us with a good opportunity to interact with other investment partners of the project.	
	4. I think investing in the products / technology of the start-up will make our investment smoother.	
	5. I think investing in the start-up will keep the product / technology of the project steady.	
Investment intention	1. Investing in the start-up will help realize the expected target earnings of the company.	Venkatesh V, Morris M G, Davis G B, et al (2003) Yi-Shun Wang et al. (2006)
	2. I think that investing in the product / technology of the start-up will help the company obtain better investment results.	
	3. The start-ups provide us with a good opportunity to interact with other investment partners of the project.	
	4. I think investing in the products / technology of the start-up will make our investment smoother.	
	5. I think investing in the start-up will keep the product / technology of the project steady.	
Government behavior and policy	1. I think the government will establish the initial enterprise evaluation standard for encouraging investment (that is, the scope of start-ups the government should encourage investment in).	L Cui, C Zhang, C Zhang, L Huang (2008)
	2. I think the government will establish the government funding support standard to encourage investment in start-ups	
	3. I think the government will provide the guidance fund for the venture capital firms that invest in start-ups.	
	4. I think the government will provide the financing guarantees for start-ups the venture capital firms invest in.	
	5. I think the government will provide the financing guarantees for the venture capital firms that invest in start-ups.	
	6. I think the government will set up the compensation system for the guarantee corporation.	
	7. I think the government will provide the preferential tax policies for the venture capital firms that invest in start-ups.	
	8. I think the government will promote the construction of the information platforms and provide more sources of start-ups for the venture capital firms.	
	9. I think the government will invest in supporting enterprise research institutes to produce more start-ups.	
	10. I think the government will cultivate the good venture capital ecosystem.	
	11. I think the government will establish the perfect law and regulation system for venture capital investment.	
Construction of information platforms	1. I think the company has sufficient sources of start-ups to support investment decisions.	Liang, Ting-Peng, Huang, Chen-Wei, Yeh, Yi-Hsuan, et al. (1980)
	2. I think the company has plenty of start-ups to choose for investment decisions.	
	3. I think the company has plenty of high-quality start-ups for investment choice.	
	4. I think the company has the comprehensive database of start-ups to support investment decisions.	
	5. I think the company has set up the strategy for data management and data security in start-ups.	

Data Collection and Statistics

Data Collection

Questionnaire survey was conducted on 158 venture capital institutions in Zhejiang, Beijing, Shanghai and other places through home visit and E-mail. A total of 160 questionnaires were issued, of which 125 were valid, and the efficiency of the questionnaire was 78.2%.

The general manager or deputy general manager of venture capital institutions among the interviewees accounted for 28.7%, the investment director accounted for 8.1%, and the investment manager accounted for 63.2%. The number of employees under 3 years accounted for 4.4%, the number of employees for 3~5 years accounted for 48.5% and the number of employees for more than 5 years accounted for 47.1%; all interviewees have the experience of investing in or participating in investment start-ups.

Empirical Analysis of the Model

Analysis of Reliability and Validity

In this paper, it is measured through SmartPLS2.0: the factor load (λ) of all the items is more than 0.7, which is in line with the suggestion of Fomell&Larcker (1981). The Cronbach's α coefficient ranges between 0.843 and 0.957, and constituent reliability (CR) ranges between 0.906 and 0.967. The average variation extraction (AVE) ranges between 0.629 and 0.854, as shown in Table 1, which accords with the recommendations and requirements given by the previous scholars.

Table 1. Reliability Index

Dimensions	Items	Factor load	Cronbach's α	CR	AVE
Construction of information platforms	Information platform 1	0.831115	0.881	0.911	0.673
	Information platform 2	0.877676			
	Information platform 4	0.781312			
	Information platform 5	0.798254			
Investment intention	Investment intention 1	0.910350	0.957	0.967	0.854
	Investment intention 2	0.917385			
	Investment intention 3	0.944963			
	Investment intention 4	0.932527			
	Investment intention 5	0.914934			
Government behavior and policy	Policy 10	0.854152	0.889	0.910	0.629
	Policy 11	0.851006			
	Policy 2	0.786458			
	Policy 3	0.836404			
	Policy 7	0.607661			
	Policy 8	0.795665			
Current investment funds	Funds 1	0.916867	0.843	0.906	0.731
	Funds 2	0.907435			
	Funds 4	0.790803			
Expected performance	Expected performance 1	0.762815	0.891	0.920	0.699
	Expected performance 2	0.865540			
	Expected performance 3	0.903745			
	Expected performance 4	0.871571			
	Expected performance 5	0.766777			

The square root of the average variation extraction (AVE) of each dimension is greater than the correlation coefficient between the dimensions, so the data in this paper are consistent with the difference validity, as shown in Table 2.

Table 2 Correlation Matrix

	Construction of information platforms	Investment intention	Government behavior and policy	Current investment funds	Expected performance
Construction of information platforms	0.820				
Investment intention	0.455	0.924			
Government behavior and policy	0.289	0.270	0.793		
Current investment funds	0.268	0.623	0.332	0.855	
Expected performance	0.563	0.592	0.175	0.271	0.836

Analysis of Structural Equation

The path coefficients and T values for each of the hypothesis relationships in the conceptual model are shown in Table 3.

Table 3 Analysis Results of Structural Equation Model

Hypothesis	Path	Path coefficient	T value	Result
H1	Government behavior and policy - current investment funds	0.342***	3.452	Supported
H2	Government behavior and policy - expected performance	-0.035	-0.381	Not Supported
H3	Government behavior and policy - construction of information platforms	0.308**	3.014	Supported
H4	Construction of information platforms - expected performance	0.596***	5.231	Supported
H5	Construction of information platforms - investment intention	0.115	1.364	Not Supported
H6	Investment funds in the current period - expected performance	0.131	1.479	Not Supported
H7	Expected performance - investment intention	0.411***	4.283	Supported
H8	Investment funds in the current period - investment intention	0.534***	7.297	Supported

Note: when the T value is greater than 1.96, * represents $P < 0.05$, when the T value is greater than 2.58, ** represents $P < 0.01$, when the T value is greater than 3.29, *** represents $P < 0.001$.

Through qualitative and quantitative analysis above, we delete 3 paths where T is not qualified, that is, H2, H5 and H6 hypotheses are not valid. The remaining hypotheses are all established. The revised conceptual model is shown in Figure 2.

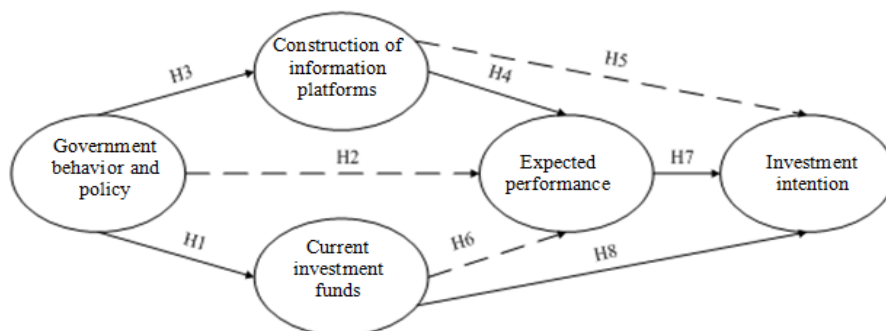


Fig. 2. The conceptual model of the government-driven mechanism for investment into the start-ups by venture capital institutions (Revised)

Conclusions and Countermeasures

Research Conclusion

The main conclusion of this paper is as follows:

- (1) Government behavior and policy have positive impact on the current investment funds of the venture capital institutions (its path coefficient is 0.342).
- (2) Government behavior and policy have positive influence on the construction of information platforms inside the venture capital institutions (its path coefficient is 3.014).
- (3) The construction of the information platform of the venture capital institutions has great positive impact on the expected performance (its path coefficient is 0.596).
- (4) The expected performance of venture capital institutions has positive impact on its investment intention (its path coefficient is 0.411).
- (5) The current investment funds of the venture capital institutions have great positive influence on their investment intention (its path coefficient is 0.534).

Countermeasures and Suggestions

Based on the above research conclusions, with the purpose of better promoting venture capital institutions to invest in start-ups, this paper puts forward the following countermeasures and suggestions:

(1) From the empirical results, it is the effective path for the government to push the venture capital institutions to invest in the start-ups by influencing current investment funds of venture capital institutions to affect their investment intentions. Therefore, the government should take positive measures to increase the current investment funds of the venture capital institutions in order to promote them to invest in start-ups. The specific countermeasures are as follows: 1) We should improve and enrich the preferential tax policy of venture capital, and abolish the current 6% value-added tax from the venture capital institutions in China. 2) The tax rate is linked to the holding period of equity. 3) A new type of policy fund, such as the guidance of the bond fund, is introduced to broaden the financing channels of the venture capital institutions.

(2) Another way for government to promote venture capital institutions to invest in start-ups is that the government first influences the expected performance of venture capital institutions by influencing the information platform construction inside venture capital, and then influences the intention of venture capital institutions to invest in start-ups. From the point of view of the way, the government should 1) establish the information base of the start-up enterprise and open up the tax information for investment in start-ups for qualified venture capital institutions. 2) set up information sharing platform for venture capital and start-ups, vigorously cultivate national high-tech enterprises and technology business incubators, and provide more sources of high-quality investment projects for venture capital institutions. 3) promote construction of the industry association, accounting firms, law firms and credit institutions, encourage and help third party institutions to consciously cultivate special value-added services related to venture capital, form programmed auxiliary system and reduce the risk of venture capital institutions to invest in start-ups caused by the imperfect information.

Acknowledgement

This research was financially supported by the Natural Science Foundation of Zhejiang Province project, "Research on the Motive System of Venture Capital Institutions Investing in Early Stage Projects in Emerging industries" (Project No. LY15G030028).

References

- [1] Jiang Yingming. The Function and Role of the Government in the Venture Capital from the International Experience [D]. Southwestern University of Finance and Economics, 2004.

- [2] Yin Ruizhe. Government Support for Venture Capital: Comparative Study of Venture Capital Guidance Fund: [J]. Management Observation, 2009, 08: 25-27.
- [3] Yang Dakai and Li Dandan. Empirical Study on the Influence of Government on China's Venture Capital Industry [J]. Journal of Shanxi University of Finance and Economics, 2012, 05: 52-60.
- [4] Kevin K. Y. Kuan and Patrick Y. K. Chau. A perception-based model for EDI adoption in small businesses using a technology-organization-environment framework[J]. Information & Management, 2001, 38(8):507–521.
- [5] Liang, Ting-Peng, Huang, Chen-Wei, Yeh, Yi-Hsuan, et al. Adoption of mobile technology in business: a fit-viability model[J]. Industrial Management & Data Systems, 1980, volume 107(8):1154-1169(16).
- [6] L Cui, C Zhang, C Zhang, L Huang. Exploring IT Adoption Process in Shanghai Firms: An Empirical Study[J]. Journal of Global Information Management, 2008, 16(2):1-17.
- [7] Venkatesh V, Morris M G, Davis G B, et al. User Acceptance of Information Technology: Toward a Unified View[J]. Mis Quarterly, 2003, 27(3):425-478.
- [8] Y Wang, H Lin, L Pin. Predicting consumer intention to use mobile service[J]. Information Systems Journal, 2006, 16(2):157–179.