

## ABSTRACT

Title of Dissertation: VENTURE CAPITALISTS' INVESTMENT AND REINVESTMENT DECISIONS

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Prior research (Wells, 1974; MacMillan, 1985, 1987; Shepherd, 1999) has focused on examining VCs' decision making at the pre-investment stage. Few studies have investigated VCs' financing decisions at the post-investment stage, and the differences between investment and reinvestment. Some scholars claimed that VCs are more likely to provide a venture with initial funding than subsequent financing (Dean & Guglierano, 1990). Others argued the opposite (Ryan, 1994; Guler, 2003). My dissertation seeks to answer this question empirically. I surveyed 40 VCs either in person or over the phone, and asked them to assess how some new incremental information will affect the likelihood that they will invest in a venture at the pre-investment vs. post-investment stage. The results have demonstrated that VCs assess the same positive information more positively at the post-investment stage compared to the pre-investment stage and hence, are more likely to provide a venture with additional than with initial funding.

VENTURE CAPITALISTS'  
INVESTMENT AND REINVESTMENT DECISIONS

by

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## Dedication

To my wife Masha.

# VENTURE CAPITALISTS' INVESTMENT AND REINVESTMENT DECISIONS

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## CHAPTER1: INTRODUCTION

Venture capitalists (hereafter VCs) use a wide range of investment criteria for screening and evaluating entrepreneurs' business proposals (Tyebjee & Bruno, 1981; 1984; Fried & Hisrich, 1994; Shepherd, 1999). Starting in the early 1970s (Hoffman, 1972; Wells, 1974; Benoit, 1974), scholars began to carry out studies seeking to identify VCs' investment criteria, and to establish their relative importance for VCs' financing decisions.

In the 1990s, several researchers have proposed that VCs utilize relevant concepts derived from the economics and strategy literature as their investment criteria (Hall & Hofer, 1993; Shepherd, 1999; Shepherd et al., 2000). For instance, Shepherd (1999) has demonstrated that VCs consistently apply notions advanced in the IO economics literature such as "the timing of entry," "the lead time" (how long a venture will maintain its leadership before competitors could catch up to it); "key success factors stability," and "industry-related competence" for screening and evaluating entrepreneurs' business proposals.

Although prior researchers have thoroughly examined VCs' investment decisions at the pre-investment stage (when VCs decide whether to provide a venture with initial financing) there are few studies dedicated to VCs' investment decisions at the post-investment stage (when VCs decide whether to provide a venture with additional financing). Scholars of VCs' post-investment decisions have also expressed different views regarding the question whether VCs are more likely to provide a venture with initial or additional financing. Some scholars have claimed that VCs are unlikely to continue investing in the same company since they want to diversify their investments

(Dean and Giglierano, 1990) Conversely, others researchers (Ryan, 1998; Guler, 2003) have argued that VCs are more likely to provide additional than initial financing to a venture in which they have previously invested as they succumb to escalation of commitment (Staw, 1976).

In this thesis, I have followed prior scholars (Sandberg et al., 1988; Shepherd, 1999) who have proposed that VCs utilize relevant concepts from the strategy and economics literatures in their decision making. In the same vein, I have isolated thirteen concepts from the strategy and economics literatures (for instance, “sector dominance,” “strategic flexibility,” “product-market strategy,” “competitor delayed response,” “competitor retaliation”), and argued that VCs employ these concepts as their investment criteria both at the pre-investment and post-investment stage albeit weight them differently.

The research question addressed in this dissertation is as follows: do VCs assess positive information regarding the same investment criteria more positively at the post-investment stage compared to the pre-investment stage, and, consequently, are more likely to provide a venture with additional financial support than to initially fund a venture?

While indebted to prior research, this thesis is distinct both theoretically and methodologically. First, I have derived a variety of pertinent concepts from the strategy and financial economics literatures, and have established that VCs in point of fact utilize these concepts as their investment criteria both at the pre-investment and post-investment stage.

These investment criteria are: 1) sector dominance in a sufficiently large and rapidly growing market; 2) winning product market strategy; 3) superior business model; 4) management flexibility, creativity and trustworthiness; 4) management superior knowledge and understanding of its sector; 5) great management team; 6) customer concern management; 7) customer prompt product endorsement; 8) customer market power to make product adoption decisions; 9) competitor delayed response to a new entry; 10) competitor retaliation expected; 11) competitor nonresponse due to own problems; and 12) competitor collaboration expected. Most interviewed VCs confirmed that they apply this set of criteria or that it is relevant for analysis of VCs' investment decisions.

Second, I have contributed to the discussion as to whether VCs are more likely to initially fund a venture or to provide a venture with additional financing (Dean & Guglierano, 1990; Steier & Greenwood, 1995, Ryan, 1994; Guler, 2003) by establishing that VCs interpret positive information obtained with respect to their investment criteria more positively at the post-investment stage than at the pre-investment stage and, hence, are more likely to provide a venture with additional financing than to initially fund a venture.

This study also employs a new data generation methodology. I asked the respondents to evaluate the incremental value of each investment criterion (at the pre-investment and post-investment stage) after the process of due diligence has been completed, and a VC has established that it is 50% likely to provide a venture with funding. This has forced VCs to ponder the actual impact of each investment criterion on investment.

## CHAPTER 2: LIERATURE REVIEW

Table 1 presents prior studies in terms of their focus, sample, data gathering and data analysis. Table 2 summarizes the main investment criteria utilized by VCs for screening and evaluating entrepreneurs' business proposals. I will begin with discussing Table 1. Subsequently, I will analyze the information presented in Table 2. After that, I will turn to the results of several studies that have examined the difference between VCs' decision making at the pre-investment and post-investment stage. A recapitulation of the accomplishments and deficiencies of prior research on VCs' investment criteria will follow. Finally, I will relate this study to prior research, and recapitulate its distinct approach.

### Focus

Most of the prior studies of VCs' decision making reported in Table 1 have focused on extracting from interviews and surveys of VCs a list of criteria VCs employ to evaluate ventures for a possible financing. In some studies, this objective was combined with related goals. Thus, some researchers have been interested in identifying the main stages of the VC investment process (Hoffman, 1972; Tyebjee & Bruno, 1984; Hisrich & Fried) and establishing the assortment of investment criteria VCs utilize throughout that process.

Other researchers have focused on detecting the investment criteria used by most successful VC firms (McMillan et al., 1987). Some scholars sought to establish whether VCs in their home country utilize the same investment criteria as those employed by VCs in North America (Rah, 1994, Zutschi et al., 1999). A number of studies have focused on a particular market such as high-technology (Bachher, 2000). Others have zeroed in on

some aspects of VCs' thought process, for instance, the role of intuition in VCs' decision making (Hisrich & Jankowicz, 1990; Hall, 1989).

### Sample

Scholars have assembled their samples via interviews, surveys or a combination of these two methods. The reported studies have used as their unit analysis a survey filled out by an individual VC; a business proposal evaluated by a VC; or a VC's "thought unit," i.e. a VC's comments with respect to an analyzed business proposal (Hall, 1989). Many samples have been small. Well (1974) has interviewed 10 VCs at 7 VC firms. Hall (1989) has interviewed 4 VCs. Kaplan & Stromberg (2000) have interviewed 10 VCs' 58 investments (in this case, "investment" was the unit of analysis) in 40 companies.

Kumar et al. (2003) has interviewed 11 VCs from India. Silva (2004) has focused on one VC firm in Portugal (he has used the method of participating observation). Muzyka et al. (1996) have interviewed 73 VCs (among three scholars) and Rah et al. (1994) have interviewed 74 VCs. MacMillan et al. (1985) have only interviewed 14 VCs but surveyed 102 VCs. Most samples have been based on 30 to 70 interviews and/or surveys.

### Data Gathering

Most studies have followed the same sequence of steps for data gathering. At the first step, scholars approached a few VCs for a preliminary interview. On the basis of such interviews, researchers have compiled lists of VCs' investment criteria. Conversely, some have derived VCs' investment criteria from the relevant concepts in strategy and economics (Shepherd, 1999; Shepherd et al., 2000).

The second step was to classify the criteria into groups such as “management competence” or “product-market criteria.” At the third step, researchers usually have tested on a larger sample the investment criteria they had compiled via initial interviews of VCs or had derived from the relevant concepts advanced in the strategy and economics literature.

Researchers have typically contacted several VCs in their area to conduct initial interviews. Scholars have not discussed how they secured these initial interviews. One can venture a guess that they have directly approached some prominent VCs in their community.

At the third stage of data gathering, scholars frequently mailed questionnaires to all members of a VC association (national or regional). The response rate was typically about 20%. Most scholars used a combination of interviews and surveys. Some only conducted surveys. A few researchers (Hall, 1988; Hall & Hofer, 1993) have conducted a live observation: they asked VCs to assess proposals in their presence and comment on them.

### Data Analysis

Originally, researchers asked VCs to assess their investment criteria on a four-point scale and subsequently rank ordered their aggregate appraisals (Hoffman, 1972; Wells, 1974). Later, scholars began to use factor analysis and cluster analysis (Tyebejee & Bruno, 1981; 1984; MacMillan et al., 1985, 1987) to establish whether their proposed classification of investment criteria into groups could be supported. In most cases, factor analysis revealed that VCs have applied their investment criteria in a different way than it

has been originally hypothesized by scholars (Tyebjee & Bruno, 1984; MacMillan, 1985; 1987).

Sandberg et al. (1986) and Hall (1989) have criticized prior research on VCs' investment criteria based on VCs' self-reports due to its common bias: overstating the number of investment criteria and understating the importance of the key investment criteria. Respectively, Sandberg et al (1986), Hall (1989) and Hall and Hofer (1993) have begun conducting studies based on verbal protocol analysis: they asked VCs to think aloud while assessing real proposals in order to capture VCs' underlying "thought units."

Riquelme and Rickards (1992) have censured verbal protocol analysis for being too subjective. They have proposed applying conjoint analysis to reveal the importance of each investment criterion by contrasting them one to another in pairs. A large group of researchers has consistently employed conjoint analysis to identify VCs' "in-use" as opposed to "espoused" investment criteria and, thus, overcome the limitations of VC self-reports (Muzyka et al., 1996; Shepherd, 1999; Shepherd et al., 2000; Shepherd & Zacharakis, 1998).

#### The Main Investment Criteria Identified in Prior Research

Next, I will summarize the main investment criteria identified in prior research (Table 2).

#### Top Management Team (TMT)

Prior studies have identified numerous management-related investment criteria that VCs utilize to decide whether to provide a venture with initial funding. Most studies have shown that VCs evaluate whether senior management is competent. Some scholars

(Wells, 1974) differentiated among management functional skills: general, marketing, financial and manufacturing. Others mostly discussed management expertise and capabilities (Fried & Hisrich, 1994).

Scholars have argued that VCs often choose not just competent but also seasoned managers (Robinson, 1987; Knight, 1994) on the basis of their track record, experience and references from prior places of employment. In addition, scholars have demonstrated that VCs consider management psychological characteristics and cognitive capabilities: perseverance, commitment, attention to detail, and high risk tolerance (Wells, 1974 Kumar, 2003).

Separately, many studies have discovered that VCs are concerned about the ability of senior management to act as leaders and be recognized as leaders by others (Robinson, 1987; Kaplan & Stromberg, 2000). According to some studies, VCs typically assess the quality of a management team, for instance, VCs prefer when a management team is balanced, i.e. it is composed of people with different functional backgrounds and skills (Muzyka et al., 1996, Bachher, 2000).

#### Market and Market Growth

Prior studies have revealed that VCs are primarily concerned whether there is sufficient access to a market targeted by a venture (Tyebjee & Bruno, 1984); whether a venture satisfies an existing market need or stimulates a new need in an existing market (MacMillan et al., 1985; 1987); whether a market is sufficiently large so that a venture can become profitable and/or whether a market is growing fast enough (Muzyka et al., 1996).



In addition, Shepherd (1999) and Shepherd et al. (2000) have derived several concepts regarding market conditions from the economics literature, and have demonstrated that VCs utilize such criteria as “key success factor stability” (VCs examine if requirements necessary for achieving success in the market change slowly or rapidly).

### Product

Prior studies have established that VCs carefully evaluate the quality of a venture’s product using the following criteria: is the product unique or sufficiently differentiated compared to competitors’ offerings (Muzyka et al., 1996)? Is the product proprietary (MacMillan et al., 1985; 1987; Zacharakis & Meyer, 1998)? Does a functioning prototype of a product exist (MacMillan et al., 1985; 1987)? Will a product allow a venture to obtain a competitive advantage due to its apparent superiority over the competitors’ products or services (Fried and Hisrich, 1994; Zacharakis and Meyer, 1998)?

### Risk

Scholars have established that in evaluating prospective investments VCs identify various types of risk they may need to tackle with regard to a particular venture. Thus, MacMillan et al. (1985) have identified five types of risk typically examined by VCs: 1/ competitive risk; 2/ bail out risk; 3/ investment risk; 4/ management risk; 5/ implementation risk. MacMillan et al. (1987) outlined five similar types of risk: 1/ management risk; 2/ competitive exposure; 3/ inexperience risk; 4/ viability risk; 5/ cash-out risk.

## Returns

Numerous studies have demonstrated that VCs are extremely concerned whether the projected returns from investment in a venture will be sufficient to justify a venture's funding (Poindexter, 1975). At the same time, prior research has indicated that VCs do not quite trust entrepreneurs' "overoptimistic" projections regarding their future returns, and pay more attention to the market growth rate and whether a product satisfies a market need (MacMillan et al., 1985; 1987; Zacharakis, 1995).

## Exit

Prior studies have shown that VCs look into their conceivable exit choices before they invest (Tyebjee & Bruno, 1984). Since VCs' funds have a limited life span (typically, up to ten years), VCs are concerned whether they will be able to liquidate their investment on time (MacMillan et al., 1985). Thus, VCs may or may not fund a venture depending on their estimates of the likelihood and timing of certain anticipated exit alternatives (Kaplan & Stromberg, 2000).

## Deal

Another important consideration for VCs is the quality of the deal. According to prior research, VCs may like a venture, but will invest in it only if they are guaranteed a certain equity stake in a venture at a certain attractive price (Poindexter, 1975; Muzyka et al., 1996).

## Strategy

MacMillan et al. (1985; 1987) have first shown that VCs separately analyze a venture's strategy (for instance, its positioning vis-à-vis competitors) as one of their investment criteria. Other researchers have also observed VCs using this investment criterion (Muzyka et al., 1996).

## Customer

Most prior studies of VCs' investment criteria have not mentioned the customer's approval as a separate investment criterion. Instead, prior scholars have demonstrated the role of market acceptance of product (MacMillan et al., 1985; 1987). Some new studies, however, have emphasized that VCs separately analyze the customer's perspective (Silva, 2004), that is, whether customers in a particular sector will be likely to endorse a product and whether senior management has developed a true understanding of their prospective customers.

## Competition

Prior studies have established that VCs carefully assess the extent of competitive threat in a sector before they decide to invest. Thus, MacMillan et al. (1987) have discovered that two underlying factors have been consistent predictors of VCs' financing decisions: a) market acceptance of a new product; and b) the degree of competitive threat. Hisrich and Jankowicz (1990) have pointed out that VCs consider the odds that a venture will be able to hold off competition and whether competitors would immediately target a venture as soon as it enters a market sector. Zacharakis (1995) has determined that VCs take into account the number and relative strength of competitors in a target market. Shepherd et al. (2000) have demonstrated that management competence and the degree of

competitive rivalry appear to be two most important criteria in VCs' evaluations of new ventures.

### Studies of VCs' Post-Investment Funding Decisions

Scholars of investment criteria expressed different opinions as to whether VCs are likely to continue funding the ventures they have previously selected for financing.

Stevenson et al. (1987) in a Monte Carlo simulation showed that VC firms investing in multiple rounds generate higher returns than VCs investing in one round only, and, hence, proposed that VCs will be likely to continue financing the ventures they have funded.

Dean (1988), and Dean and Baksi (1990) pointed out that VCs need to compare first-time/early round opportunities and multiple-investment/late round opportunities and choose those that promise the highest return. Dean and Giglierano (1990) and Steier and Greenwood (1995) have shown that it may be difficult for a startup that has obtained initial financing in the first round to raise more money for further rounds because their initial investors may be tapped out, and since a great number of VC firms "manage uncertainty (a) by spreading funds across ventures and (b) not funding subsequent rounds."

Conversely, Ryan (1994), Guler (2003) and Birmingham et al (2003) have argued that VCs exhibit escalation of commitment (Staw, 1976) with respect to their ventures and waste resources by providing new rounds of financing to underperforming portfolio companies. Thus, prior researchers have expressed contrary opinions as to whether VCs are more likely to provide a venture with initial funding or to provide it with additional financing.

## Conclusions

### The Accomplishments of Prior Research:

Prior research has identified a number of key investment criteria used by VCs for evaluating entrepreneurs' business proposals, and has established their relative importance. Specifically, prior studies have shown that the size and attractiveness of the market (Tyebjee & Bruno, 1984); management capabilities and functional skills (Wells, 1974); the uniqueness of a product or service (Fried & Hisrich, 1994); market acceptance of a product and the degree of competitive threat in the marketplace (MacMillan et al., 1985; 1987; Muzyka et al., 1996) are among the topmost investment criteria in a VC's repertory.

Prior research has also developed two contrasting methods of identifying VCs' investment criteria that can be regarded as complementary. While traditional research has established VCs' investment criteria by way of conducting interviews and surveys of VCs (Tyebjee & Bruno, 1984; Muzyka et al., 1996), more recent studies (Shepherd, 1999; Shepherd et al., 2000) have initially derived concepts relevant to VC investment from the economics and strategy literature and then demonstrated that VCs actually utilize them as investment criteria. The second method allows avoiding some biases of prior research based on VCs' self-reports since it applies knowledge from other disciplines to improve understanding of VC investment. Yet this method needs to be grounded in study of VCs' practices.

Prior research has also posed an all-important question: it is preferable for VCs to continue investing in their existing portfolio companies or to invest in new promising ventures (Stevenson et al., 1988)? Scholars have answered this question differently.

Some have argued that VCs may be less likely to provide additional financing to their portfolio companies since they could be “tapped out” or may prefer to diversify their investments (Steier & Greenwood, 1988; Dean and Guglierano, 1990). Others have demonstrated that VCs tend to invest far too long in their underperforming ventures instead of terminating them in a timely fashion since they fall prey to escalation of commitment (Ryan, 1998; Guler, 2003).

This question has a great significance for VCs. VCs that fail to continue investing in their promising companies and diversify instead into new obscure companies may lose considerable profits in the offing. Similarly, VCs that continue investing in failing companies instead of putting their money into new promising ventures risk to lose their investment.

#### The Deficiencies of Prior Research

Prior research has focused on identifying the investment criteria VCs apply at the pre-investment stage, and has established their relative importance. In doing so, previous studies have assumed that VCs utilize and prioritize investment criteria at the post-investment stage in the same way as they do at the pre-investment stage. However, VCs may employ contrasting criteria or prioritize them differently depending on the stage of investment. Indeed, Dean and Guglierano (1990) have shown that VCs are less interested in management expertise at the post-investment stage compared to the pre-investment stage.

Furthermore, instead of continuing to research new investment criteria, scholars lately have been testing whether VCs use the investment criteria discovered in prior studies (Kumar, 2003). VCs, however, are likely to change their investment criteria as

the market situation changes and as VCs develop more sophisticated analytical tools; hence, academic research needs to persistently reexamine VCs' decision making in its evolution.

Specifically, VCs these days are more focused on finding future leaders that have a potential of seizing dominance in their sector, that exhibit strategic flexibility, and have an impressive product-market strategy and business model. Prior studies have not paid much attention to these criteria since in the previous period they were not critical for VC financing. These criteria have become more important after the stock market bubble has burst (Hardymon et al., 2006).

#### How Does This Dissertation Fit Into the Existing Literature?

Following prior studies (Sandberg et al, 1988; Shepherd, 1999; Shepherd et al., 2000), I derive a number of relevant concepts from the strategy literature, and test whether VCs actually utilize these concepts as their investment criteria both at the pre-investment and post-investment stage.

This dissertation seeks to answer the question posed in prior research: are VCs more likely to provide a venture with initial or additional financing? I approach this question empirically by asking VCs to assess how the same information will affect the likelihood of their funding a venture at the pre-investment stage vs. post-investment stage.

**Table 1. Prior Studies' Focus, Sample, Data Gathering and Analysis.**

<b>Author(s) and Date</b>	<b>Focus</b>	<b>Sample</b>	<b>Data gathering</b>	<b>Data Analysis</b>
Hoffman, 1972	VC Investment Process	39 VCs	Questionnaires and interviews	Descriptive
Wells, 1974	VC decision making	10 VCs at 7 VC firms	Interviews & questionnaires	Qualitative analysis; correlation
Poindexter, 1975	Efficient markets	91 VCs	Questionnaires	Ranking scale
Benoit, 1975	VCs' investment behavior	22 VCs	Questionnaires & Interviews	Qualitative analysis; counting
Tyebjee & Bruno, 1981	Decision making	46 VCs	Questionnaires; VCs' evaluations of deals; interviews	Counting; Factor analysis
Tyebjee & Bruno, 1984	VC investment activity	41 VC firms	Questionnaires 41 respondents evaluated 90 proposals	Counting; Factor analysis
MacMillan, Siegal, & Narasimha 1985	Investment criteria	14 VCs + 102 VCs	14 interviews and 102 returned Questionnaires	Factor analysis
MacMillan, Zemann, & Narasimha, 1987	Criteria distinguishing successful VC firms in the screening process	6 VCs (initial interviews) + 67 VCs evaluated 150 ventures	6 structured personal interviews + 67 returned questionnaires	Cluster analysis Factor analysis
Khan, 1987	Noncompensatory behavioral decision models	36 VCs	VCs' reports on their investments	Conjunctive and disjunctive actuarial models used to model VCs' judgments and the environment



<b>Author(s) and Date</b>	<b>Focus</b>	<b>Sample</b>	<b>Data gathering</b>	<b>Analysis</b>
Robinson, 1987	VC firms' strategies	53 VCs	Questionnaires	Ranking of mean importance scores Varimax rotated factor analysis Modeling
Siskos, Zopounidis, 1987	VCs' evaluation criteria	1 VC firm	From existing research	Modeling
Sandberg, Schweiger, Hofer, 1988	VCs' decision processes	1 VC; 40 thought units	Proposals for evaluation	Verbal protocol analysis
Hall, 1989	VCs' decision making	4 VCs	Interviews in-person or on the phone	Verbal protocol analysis
Hisrich, Jankowicz, 1990	Intuition in VCs' decisions	5 VCs (6 proposals)		Repertory grid technique
Riquelme & Rickards, 1992	Hybrid conjoint analysis applied to VCs' decision making	13 VCs	Interview	Modeling
Fried & Hisrich, 1994	VCs' decision making	18 VCs	Interviews	Analysis of VCs' responses
Rah, Jung, Lee, 1994	Venture evaluation in Korea	74 VCs	Questionnaires and interviews	Factor analysis and discriminant analysis
Knight, 1994	VCs' investment criteria: a cross cultural analysis	31 VCs; 50 SBDCs	Questionnaires	Rankings of responses
Zacharakis, 1995	The venture capital investment decision	51 VCs in three groups	Scenarios' Semi-structured Interviews	Regression
Muzyka, Burley, Leleux, 1996	Trade-offs in investment decisions	73 VCs	Questionnaires and interviews	Conjoint analysis: evaluate matrices based upon a pair of investment criteria

<b>Author(s) and Date</b>	<b>Focus</b>	<b>Sample</b>	<b>Data gathering</b>	<b>Analysis</b>
Boocock & Woods 1997	VCs' evaluation criteria	232 business proposals received by a VC fund	Business proposals	Analysis of the reasons for proposal rejection
Zutschi, Tan, Allampalli, Gibbons, 1999	Singapore VCs' Investments' Evaluation Criteria	31 VCs	Questionnaires	VCs' ratings used to establish which investment criteria are more important
Shepherd, Ettenson, Crouch, 2000	VCs' Assessments of new venture strategy and profitability	66 VCs representing 47 VC firms	Conjoint decision making task administered in person or by mail	Conjoint Analysis OLS regression
Bachher, 2000	VCs' investment criteria in technology-based new ventures	100 VCs	Interviews and web-based surveys	ANOVA
Kaplan & Stromberg, 2000	How do VCs choose their investments?	10 VC firms; 58 investments in 40 companies	Interviews and surveys.	Regression
Kumar Kaura, 2003	VCs' screening criteria	11 VCs	Questionnaires	Kendall's tau-c used to assess the association among variables (a measure of agreement among raters)
Silva, 2004	VCs' decision making in small equity markets	1 VC firm; 16 early-stage proposals	Participant observation (internship)	Grounded method: observation and interpretation

**Table 2. VCs' Investment Criteria Reported in Prior Studies.**

The criteria can be regarded as independent variables, and the decision to invest can be regarded as a dependent variable. (The numbers in the cells show the relative importance of each criterion demonstrated in the respective study).

Definitions of criteria:

1. TMT – senior management's capabilities, expertise, commitment, leadership qualities, balance in the TMT.
2. Market – the attractiveness of the target market.
3. Market growth – fast sector growth as a prerequisite for investment.
4. Product – a unique product that meets a distinct market need.
5. Risk – the types of risk that VCs will need to consider.
6. Return – required rate of return or level of profitability.
7. Exit – a VC's ability to exit a venture in a timely fashion (usually 5 – 7 years).
8. Deal - the quality of the deal (% of equity and the price of equity purchased).
9. Strategy – how a venture positions itself vis-à-vis its competitors in a sector.
10. Customer – whether a venture has a good understanding of its prospective customers.
11. Competition – the number and relative strength of competitors in a sector.

Studies/Criteria	TMT	Market	Market Growth	Product	Risk	Returns	Exit	Deal	Strategy	Customer	Competition
1. Hoffman, 1972	2	3		1							5
2. Wells, 1974	1	3		2							
3. Poindexter, 1975	1				3	2		4			
4. Benoit, 1975	1	3		5		2					4
5. Tyebjee & Bruno, 1981	3	2			4	1	5				
6. Tyebjee & Bruno, 1984	3	1		2			5				4

Studies/Criteria	TMT	Market	Market Growth	Product	Risk	Returns	Exit	Deal	Strategy	Customer	Competition
7. MacMillan, Siegal, & Narasimha, 1985	3						2		4		1
8. MacMillan, Zemann, & Narasimha, 1987		2									1
9. Khan, 1987	1				2						3
10. Robinson, 1987	4	2							3		
11. Siskos, Zopounidis, 1987	4	1				2					
12. Sandberg, Schweiger, Hofer, 1988	3	2					4				1
13. Hall, 1989		1	2								3
14. Hisrich, Jankowicz, 1990	1										
15. Riquelme & Rickards, 1992	1			2							
17. Fried & Hisrich, 1994	2					3					
18. Rah, Jung, Lee, 1994	1	2		3			4				
19. Knight, 1994	1	3		2			4				

<b>Studies/Criteria</b>	<b>TMT</b>	<b>Market</b>	<b>Market Growth</b>	<b>Product</b>	<b>Risk</b>	<b>Returns</b>	<b>Exit</b>	<b>Deal</b>	<b>Strategy</b>	<b>Customer</b>	<b>Competition</b>
20. Zacharakis, 1995	2	1	4	3							5
21. Muzyka, Burley, Leleux, 1996	1	2		3		5		6	4		
22. Boocock & Woods 1997	5	2			6			4			
23. Zutschi, Tan, Allampalli, Gibbons, 1999	1	2		4		3					
24. Shepherd, Ettenson, Crouch, 2000	1					3					2
25. Bachher, 2000	1	2		3		5					
26. Kaplan & Stromberg, 2000		1		2							4
27. Kumar & Kaura, 2003	2	3			1	4					
28. Silva 2004	1		3					5		4	

## CHAPTER 3: THEORY

In his doctoral dissertation (1998), and a number of subsequent publications (1999; 2000), Shepherd has proposed some major changes in conducting research on VCs' investment criteria. Instead of asking VCs (as prior scholars did) what investment criteria they apply to evaluate new ventures Shepherd (1999) has introduced a reverse procedure. Based on the literature in IO economics, he has identified some investment criteria that VCs would be likely to use for analyzing entrepreneur's business proposals, and then has demonstrated that VCs employ such criteria via interviews and surveys with VCs.

Following Shepherd's (1999) approach, I seek to identify a number of relevant variables from the strategy literature that may shed some additional light (compared to prior research) on how VCs evaluate their investments. Based on strategic theories (Kaplan & Norton, 1992, 1996; Grimm, Lee & Smith, 2005) and interviews with VCs (Roberts & Barley, 2004; Hardyman et al., 2005) that have recently become available I examine the following thematically organized sets of variables: 1/ variables related to a venture's business plan; 2/ variables related to a venture's management; 3/ variables related to a venture's customers; and finally, 4/ variables related to a venture's competition. In what follows, I will describe the variables pertaining to each of these groups.

### Business Plan Related Investment Criteria

In a recent HBS study, Roberts and Barley (2004) posed the following questions to top VCs regarding their appraisals of prospective investments: "1) How do you evaluate potential venture opportunities?; 2) How do you evaluate the venture's

prospective business model?; 3) What due diligence do you conduct?; 4) What is the process through which funding decisions are made?; 5) What financial analyses do you perform?; 6) What role does risk play in your evaluation? 7) How do you think about a potential exit route?”

The interviewed VCs affirmed that a venture’s business model plays an important role in their investment decision (Roberts & Barley, 2004). In a similar vein, other scholars have demonstrated the critical importance of a venture’s product market strategy for receiving VC support (Muzyka et al., 1989; Hellmann & Puri, 2000). Product market strategy has to do with placing a venture’s product in a fitting market sector and adequately positioning it vis-à-vis competitors’ offerings. Thus, highly innovative products may require a different type of positioning (and are more likely to receive VC support) compared to conventional products (Hellmann & Puri, 2000). Business model generally relates to a venture’s selection of a suitable sales approach and of an appropriate configuration of distribution channels (Roberts & Barley, 2004; Hardyman et al., 2006).

These “business plan components” (product-market strategy and business model) have not been at the forefront of prior research on VCs’ investment criteria although MacMillan et al. (1985, 1987) have established that a “venture’s strategy” is one of the important criteria VCs apply to evaluate their prospective investments. However, these days there is a much stronger emphasis in the literature (Hellmann & Puri, 2000; Roberts & Barley, 2004) on “business plan” categories, and their impact on VCs’ investment decision.

The theme of market leadership (or sector dominance) has lately become salient in the strategy literature. Powell (2003; 2005) argued that a firm may become dominant even in a perfectly competitive industry and proposed measuring a firm's leading position by the number of its "wins" over competitors. Shamsie defined sector dominance as "the observed pattern on the part of a firm to develop and maintain a strong and clear lead in market share over all other competitors for a prolonged period of time" (2003: 199). Along the same lines, scholars of VCs' financing decisions (Shepherd, 1999) have shown that VCs use the variable "lead time" (an extended period of monopoly for the first entrant prior to competitors entering the industry) as one of their topmost investment criteria.

I suggest, however, that VCs use the criterion of sector dominance with some qualifications. A venture expected to seize dominance in its sector will only interest a VC if it operates in a sufficiently large and rapidly growing sector. Prior studies (Tyebjee & Bruno, 1984; Fried and Hisrich, 1994; Muzyka et al., 1996) have shown that VCs assess the quality of the market ("market attractiveness"). Hence, as part of their effort to measure the extent of business plan uncertainty, VCs would examine whether a venture is expected to achieve sector dominance in a sufficiently large and rapidly growing marketplace.

To sum up, it is important for VCs to evaluate the following variables related to a venture's business plan: "product-market strategy," "business model," and "sector dominance" that is expected to be obtained soon in a relatively large and rapidly growing marketplace.

#### Management Related Investment Criteria



Prior studies have shown that VCs often emphasize quality of management as the most important (or at least an absolutely essential) investment criterion (Wells, 1974; MacMillan et al., 1985). Specifically, prior scholars have examined the importance of management skills and experience (Wells, 1974, Poindexter, 1974, Robinson, 1987); management commitment (Well, 1974); management equity stake in the venture (Poindexter, 1976; Tyebjee & Bruno, 1984); management creativity (Khan, 1987); management leadership potential (Muzyka et al., 1996); and management attention to detail (Kumar, 2003).

It appears, on the one hand, that some of the management-related criteria (for instance, attention to detail or risk tolerance) identified in the literature could be merely an aspect of a broader, all-inclusive criterion such as management competence. On the other hand, some other important management-related criteria (for instance, management creativity and flexibility) may point to a somewhat different and even separate aspect of management.

Prior researchers have demonstrated that VCs extensively evaluate management education, track record, and background (Tyebjee & Bruno, 1984; Muzyka et al. 1996). However, VCs are also known for investing in recent college graduates (or even college dropouts) who do not have any formal credentials but are nevertheless extremely qualified. At the end of the day, VCs are interested in whether entrepreneurs whose ventures they consider for financing have adequate knowledge and understanding of their sector.

VCs also evaluate whether the entrepreneur(s) has assembled a viable team of like-minded and well-suited people who will be able to work together under considerable

strain for years to come. Prior scholars have shown that as part of their due diligence VCs examine whether the founder(s) of a venture have recruited quality people into their team (Robinson, 1987, Muzyka et al., 1996).

The strategy literature (Sanchez, 1995, Hitt et al., 1998, Zhang, 2005) heavily emphasizes the role of strategic flexibility as an all-important characteristic of business leaders. Shimizu and Hitt (2003) define strategic flexibility as an “ability to recognize problems and reverse resource commitments in a timely fashion when the initial action and resource commitments turn out to be unsuccessful” (2003: 45). Since new ventures operate in rapidly changing markets VCs are likely to view flexibility as one of the most important management characteristics. However, flexibility as merely readiness to change previously made decisions may not be sufficient. Khan (1986) pointed out that VCs especially value management capable of delivering ingenious solutions to detected problems.

In addition, Sapienza and Gupta (1994) showed the importance of a timely and reliable stream of information imparted by management to VCs as a factor that buttresses the VC-entrepreneur relationship. Even though it is possible to evaluate separately these three management attributes – flexibility, creativity and trustworthiness – they are likely to be evaluated by VCs in an integrative fashion. Essentially, VCs could be asking themselves: can we trust this management (are they trustworthy?) to be able to adjust to the changing marketplace (are they flexible?) and exhibit ingenuity in doing so (are they creative?).

To summarize, I propose that while prior research has identified numerous management attributes that VCs may assess as part of their examination of entrepreneurs’

business proposals many of these attributes could, in fact, be redundant. Essentially, VCs focus on assessing a venture's management by posing three questions. First, does the management possess a superior knowledge and understanding of its sector? Second, has the management assembled a group of top-quality people that can work well as a team? Third, can the management be trusted to provide a reliable stream of information regarding a venture's progress and be able to adjust in a creative fashion to the changing marketplace?

#### Customer Related Investment Criteria

Any business plan begins with a characterization of a venture's offering - product or service. However, VC firms are not solely interested in whether a venture has an excellent or even unique product. VCs are also seeking to make sure that the senior management of a venture has a good understanding of its customers, and that the customer will actually endorse a product in a relatively short period of time to justify the investment.

A great product that does not satisfy an existing market need (or satisfies the need of a very limited and unprofitable market) will not interest a VC. This is why VC firms emphasize that entrepreneurs need to understand their prospective customers (Roberts & Barley, 2004). The VC firm Highland explains to entrepreneurs on its website that they need to describe their product from a potential customer's perspective: "Frequently, the most successful companies are started by frustrated customers. The product discussion should explain the product and its benefits from a customer's perspective, not from the designer's."

Unfortunately, only a few studies of VCs' investment criteria have brought attention to the fact that VCs separately evaluate (as part of their due diligence) how the customer will react to the introduction of a venture's product (Gorman & Sahlman, 1989, Silva, 2004). In contrast, the strategy and finance literatures have developed various measures of the customer's perspective as one of the most important tools in company valuation.

Kaplan and Norton (1992, 1996) first introduced a balanced scorecard for evaluating companies' performance. The balanced scorecard includes four perspectives: financial, internal, customer, and innovative. Evaluating "how customers see us" allows focusing on operational strategies that firms often disregard (Kaplan & Norton, 1992). Currently, over 50% of Fortune 1000 companies use a balanced scorecard (BSC) whereas very few small businesses apply that tool (Gumbus & Lussier, 2006). VCs also routinely recommend entrepreneurs that they need to evaluate their product from a customer's perspective (Robert & Barley, 2005).

I propose that VCs investigate three most important customer related variables. First, VCs want to make sure that the management of a venture pays attention to the customer, identifies the customer's concerns, and is able to quickly readjust its approach in response to the feedback coming from the customer. Second, VCs assess the timing of the customer's expected endorsement of a new product. Many VCs insist on a "scalability" of their investment: a limited investment should be sufficient for securing a high level of profitability. Before they invest VCs assess how many customers will be likely to order the product in sufficient quantities within a certain time frame (Roberts & Barley, 2004).

Finally, I propose that VCs evaluate whether an open market space exists for a venture's product. If the market is not sufficiently open (a quasi-monopoly such as Microsoft has locked most customers into exclusive contracts) it may be hard for a new venture to become profitable even if it offers a superior product compared to its rivals. To sum up, I hypothesize that VCs assess a venture's quality of customer management; the timing and magnitude of customer product endorsement as well as the degree of openness in the marketplace as part of their evaluation of a venture's customer-related variables.

#### Competitor Related Investment Criteria

Prior research (Tyebjee and Bruno, 1984; MacMillan et al., 1985, 1987; Hisrich & Fried, 1994) has established that VCs assess the degree of competitive threat following a venture's entry as part of their screening and evaluating entrepreneurs' business proposals. However, previous scholars have not distinguished among various types of competitive responses to a new entry, and have not examined whether a VC's appraisal of expected competitive responses to a new entry impacts the likelihood of a VC's investment.

In contrast, the strategy literature has developed an elaborate theory of competitive dynamics (Chen, Smith, Grimm, 1992; Ferrier & Smith, 1999; Grimm, Lee, Smith, 2005) that discriminates among miscellaneous types of competitive actions and reactions. Thus, strategy studies (Chen, 1996) have established that competitors are more likely to respond to a competitive move (like a new entry) if they are sufficiently aware of the emergence of a new competitor; if they are able to respond; and if they are motivated to do so. Awareness, ability, and motivation as well as a variety of other

factors, for instance, the intensity of a competitive move (Grimm, Lee & Smith, 2006) determine whether competitors will immediately respond to a new entry or delay their response.

Applying a theory of competitive dynamics to VCs' evaluation of entrepreneurs' business proposals, it appears that VCs should examine four main aspects of competitor uncertainty. First, VCs may assess the likelihood of a delayed response to a new entry. Such delayed response would enhance a venture's chances of survival, and, hence, make VCs more willing to invest in a venture. Second, VCs may estimate a possible harm to a new venture as a result of competitor retaliation. Eventually, competitors are likely to respond to a new entry, and VCs will need to examine whether a venture would be able to survive a vigorous reprisal from an entrenched competitor. VCs will be less likely to invest if (based on competitors' reputation) they foresee a strong retaliation (such as price war).

Third, VCs must consider whether competitors will be able to respond given their circumstances. A competitor may be less likely to take action if it experiences serious problems, and does not possess the requisite resources for launching an attack (Chen & MacMillan, 1992). A VC will be more likely to invest in a new venture if it believes that the competitors already operating in the target market cannot afford to attack a new entrant.

Fourth, competitive responses to a venture's entry may represent an opportunity. The strategy literature has extensively researched the subject of strategic alliances among industry competitors (Child & Faulkner, 1998; Subramani & Venkatraman, 2003). In addition, the strategy literature has established that competitors may use strategic

alliances to gain more information about entrepreneurial ventures regarded as promising acquisition targets (Kale et al., 2002). When an entrenched competitor is more likely to offer a venture to collaborate (than to launch an attack) this increases a venture's chances of survival. If a VC establishes that competitors will be interested in building a strategic alliance with a venture (with an eye to an acquisition) a VC will be likely to invest in a venture.

To sum up, the strategy literature has differentiated among various types of competitive responses to a new entry, and has examined their potential effect on a venture's survival. Previous studies of VCs' investment criteria have not utilized the concepts developed in the strategic theory of competitive dynamics. In this dissertation, I propose that as part of their due diligence VCs analyze how different competitive responses will affect a venture's situation, and posit that such appraisals affect the likelihood of a VC's investment.

Therefore, VCs will assess four types of competitive responses as part of their examination of expected competitor reactions: 1/ the likelihood of competitors' delayed response; 2/ the likelihood of competitors' eventual retaliation; 3/ the likelihood of competitors' nonresponse due to their own problems; and 4/ the likelihood of competitor collaboration.

#### VCs' Financing Decisions at the Pre-Investment vs. Post-Investment Stage

VC firms frequently provide subsequent rounds of financing to their portfolio companies (Gorman & Sahlman, 1989; Dean & Guglierano, 1990). At times, ventures find it difficult, though, to obtain a follow-on financing. This is because some VC firms may provide initial financing but not subsequent rounds of financing. VC firms can also

prefer to invest in new ventures rather than to provide more financing to their portfolio companies (Dean & Guglierano, 1990).

Nevertheless, VC firms by and large offer subsequent financing to their portfolio companies, and need to assess whether further investment is justified. One study has shown that VCs assess follow-on investments differently than they assess initial investments (Dean & Guglierano, 1990). At the follow-on stage, VCs may be more interested in evaluating a portfolio company's performance than its management's qualifications (Dean & Guglierano, 1990). Another study (Steier & Greenwood, 1995) showed the difficulties that a venture may face in obtaining additional financing from its VCs.

In contrast, other researchers (Ryan, 1998; Guler, 2003; Birmingham et al., 2004) have argued that VCs overcommit to their ventures and continue investing despite the mounting negative feedback regarding their portfolio companies' performance. Overall, these scholars have hypothesized that VCs' behavior can be explained as escalation of commitment (Staw, 1976).

### The Principal Hypothesis

In this study, I examine whether VCs are more likely to provide a venture with additional than initial financing. I propose that VCs will interpret the same positive information at the post-investment stage more positively compared to the pre-investment stage and, consequently, will be more likely to invest in a venture (on the basis of the same positive information) at the post-investment stage compared to the pre-investment stage.

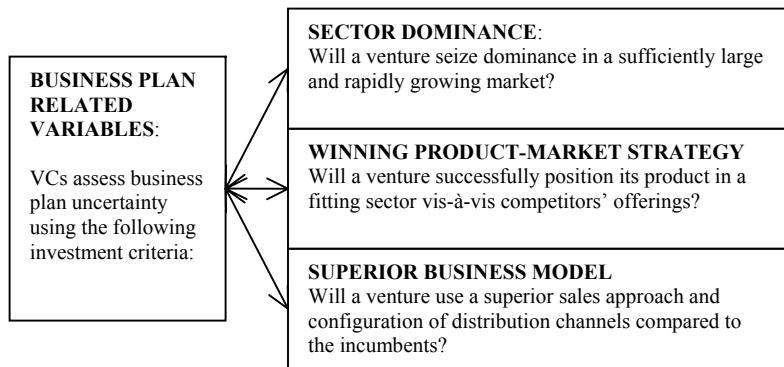


Why would VCs interpret the same positive information more positively at the post-investment stage than at the pre-investment stage? The most important reason is that VCs will generally have more background knowledge (more familiarity with the venture, and its environment) at the post-investment stage than at the pre-investment stage.

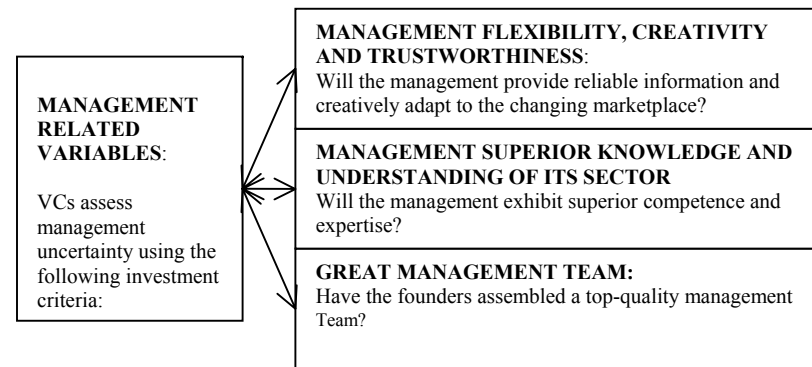
At the pre-investment stage, VCs seek to evaluate a venture's business plan, get to know its management, assess whether a venture's product will satisfy customers' need, assess whether customers will be likely to start buying soon after the product becomes available, and assess how competition may react to a new venture's entry into the market. Although VCs continue to evaluate these factors at the post-investment stage they will have considerably more contextual knowledge to establish whether some positive information regarding the venture is accurate. This is why VCs may value positive information higher at the post-investment stage than they value it at the pre-investment stage.

The Principal Hypothesis: Because of their growing contextual knowledge and familiarity with the venture, VCs will be more likely to evaluate the same positive information more positively at the post-investment stage compared to the pre-investment stage; hence, VCs will be more likely to provide a venture with additional financing than to initially finance it.

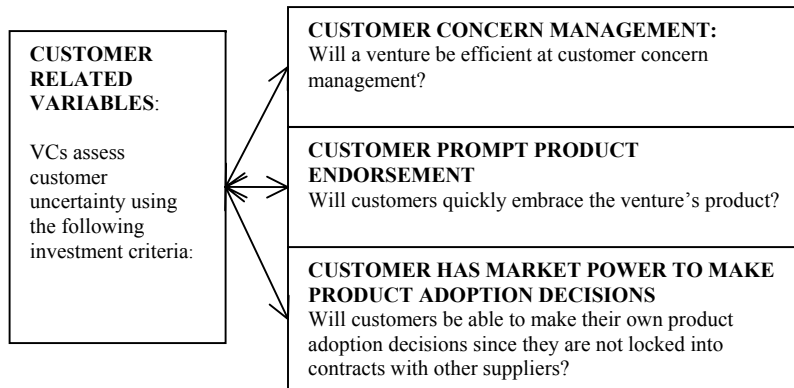
**Figure 1. Business Plan Related Investment Criteria**



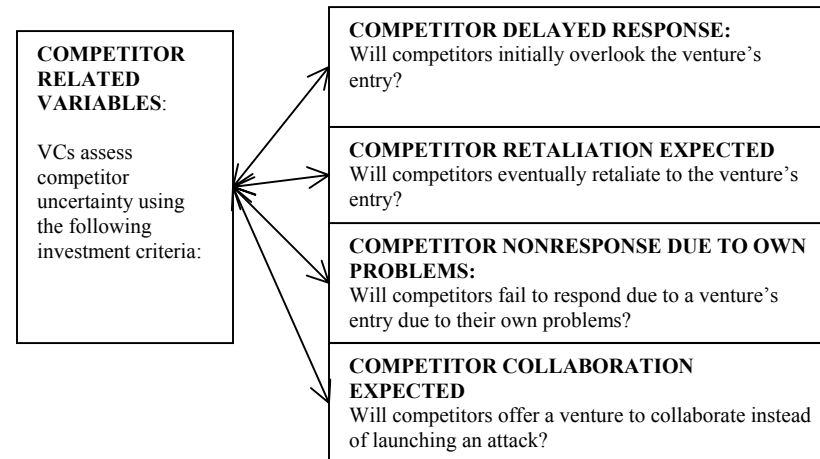
**Figure 2. Management Related Investment Criteria**



**Figure 3. Customer Related Investment Criteria**



**Figure 4. Competitor Related Investment Criteria**



## CHAPTER 4: METHOD

### Data Collection and Sample

I used three approaches to contact venture capitalists for interviews. First, I was able to utilize the extensive network connections of a former director of the Dingman Center for Entrepreneurship at the University of Maryland who had worked for many years as a general partner at a well-known VC firm. He was also active for a long time at the Mid-Atlantic Venture Capital Association (MAVA). I was lucky enough to receive extensive help from that scholar and practitioner with my research. He also volunteered to introduce me to fifty VCs he knew personally, and ask them to meet with me for an interview.

From February of 2006 through June of 2006, the former director of the Dingman Center for Entrepreneurship has sent fifty emails to his colleagues at forty VC firms asking them for an interview. The emails have targeted VC firms associated with the MAVA, and listed on the MAVA website. 25 VCs have agreed. The response rate was 50%.

Second, I have contacted an elected official at the National Venture Capital Association (NVCA), and asked if he could recommend me some VCs who frequently write themselves (or give talks) on the subject of VCs' investments. He has advised me to contact ten prominent whose firms are located in Silicon Valley and in New England. I contacted all 10, and 8 out of 10 VCs agreed to an interview. The response rate was 80%.

Third, I have sent 20 emails to other VCs listed on the MAVA website that the former Director of the Dingman Center for Entrepreneurship did not know personally,

and, hence, could not contact directly. Seven VCs have agreed to an interview (a response rate of 30%). In all, I have conducted 40 interviews; the aggregate response rate was 50%.

The VC firms I have interviewed are diverse in terms of their preferred stages of investment (half of the sample are early-stage investors, and half of the sample are late-stage investors); sectors they habitually target for investment (there are three main groups of VCs in the sample – VCs funding bio sciences companies; VCs funding high-technology companies, and VC funding communications companies); age; capital under management and reputation in the VC community (some of the VC firms in the sample are startups while others have been listed among the top twenty-nine VC firms in the USA (Hardymon et al., 2006). I have obtained an average capital under management for all the VC firms (\$472 million) and all the U.S.-based VC forms (\$620 million) listed in Venture Xpert, a Thompson Financial database. The average capital under management in my sample is \$1389 million. Due to the presence of an outlier, a very large VC firm included in the database, and a small sample size, the mean was higher than either the overall or U.S. average.

I have conducted a one-sample t test to verify whether the mean capital under management in my sample (\$1389 million) was significantly different from the mean capital under management of all VC firms (\$472 million) and all U.S.-based VC firms (\$620 million) respectively. The results have shown that the difference between the mean in my sample and the mean of all the VC firms was not significant ( $t = .9006$ ). The difference between the mean in my sample and the mean of the U.S.-based VC firms was also not significant ( $t = .7552$ ). This indicates that my sample can be regarded as

representative (in terms of capital under management) compared to the population of all VC firms and all U.S.-based VC firms.

### Operationalization of the Variables

To operationalize the thirteen variables (representing VCs' investment criteria and organized into four thematic groups), I asked the respondents to assess them on a 100-percent scale. The interview commenced with the following passage I read to all the respondents:

Suppose you are faced with a venture that you are 50% likely to finance and 50% likely not to finance. What is the likelihood that you will decide to invest in a venture provided that you have just obtained some additional information which changed your beliefs regarding the venture in the following way...?

The survey has two almost identical sections. In the first part of the survey, the respondents assessed the likelihood that they will initially invest in a venture. In the second part of the survey, the respondents assessed the likelihood that they will continue investing in a venture. The only difference between the questions in the first and second sections of the survey is that the questions in the second section state that the respondents know the respective information from their experience of overseeing the venture in question.

For instance, in the first part of the interview I have rendered to the respondents the following information: "you now believe that the senior management recognizes the concerns that the customer may develop about the venture's product or service and proposes some reasonable tactics that will help in allaying such potential customer concerns."

In the third part of the interview, I have rendered to the respondents similar information: “you now believe that the senior management has early recognized some concerns that the customer initially developed about the venture’s product or service and has proposed some reasonable tactics that helped in allaying the customer’s initial concerns.” The only difference between the ways the information is conveyed in these two questions is that the events described in the first question are merely hypothetical (they have not happened yet) while the events in the second questions have already occurred.

There are, of course, some significant changes that might occur at the post-investment stage compared to the pre-investment stage. First, a VC fund that has invested in a particular venture will be closer to liquidation and, hence, VCs may be reluctant to invest in new companies. Under this circumstance, VCs could be biased toward continuing with a follow-on investment. Thus, it will be more likely that a VC will provide its portfolio company with additional financing than finance some other venture.

Second, a VC firm may also use somewhat different strategies for screening ventures for follow-on financing compared to initial financing. Although most VCs I have interviewed asserted that they use the same criteria at both stages, some VC firms still may be using different procedures at the pre-investment and post-investment stage. Third, the political, economic and financial context may change from one stage to another. Thus, if VCs have decided to finance a venture during a hot market, and are now trying to determine whether to provide it with additional financing during a

cold market, they may be more likely to continue financing a venture than seek a new investment.

While such considerations are valid, I have specifically instructed the respondents that the only difference between the two compared stages has to do with VCs' increased experience in working with a portfolio company, and that any other factors should be disregarded.

## CHAPTER 5: RESULTS

The descriptive statistics are offered in Table 3. The correlations among the reported variables indicate that the 13 investment criteria are not strongly correlated with one another along the lines of the suggested thematic groups: business plan related variables, management related variables, customer related variables and competitor related variables. To establish how these variables are actually associated I ran a factor analysis.

### Factor analysis

The actual factor analysis is not reported. Instead, a condensed interpretation of the results of factor analysis is presented in Figure 5. Because of my small sample size (40 VCs), the factor analysis may not be reliable and therefore will only be used as one guide to condense the data set.

I found that the thirteen variables introduced in Chapter 3 of this dissertation (representing VCs' investment criteria) load on seven factors rather than on four factors. Hence, the initial thematic classification of variables (business plan variables, management variables, customer related variables and competitor related uncertainty) does not correspond with how VC apply their investment criteria.

Two business plan related variables (“winning product-market strategy” and “superior business model”), two management related variables (“management sector knowledge” and “great management team”) and one customer related variable (“customer concern management”) all loaded on the first factor. Hence, while it is possible to classify these variables thematically VCs actually conceive of these five variables as one factor.



This first factor can be described as “strategy formulation and execution module.” Apparently, VCs are seeking to establish not only whether a venture has a winning product market strategy and a superior business model but also whether the management has the requisite qualifications and capabilities to execute the strategy both in terms of internal coordination (can they really work as a team?) and ability to manage the customer.

Two variables – one customer related (“customer market power to make product adoption decisions”) and the other competitor related (“competitor collaboration expected”) - load on the second factor. These two variables are meaningfully related to each other. The variable “customer market power to make product adoption decisions” points to the relative ease of access and operation in the marketplace. The variable “competitor collaboration expected” indicates that the competitor prefers to exchange capabilities with a new venture rather than to forcefully attack it. Hence, both variables point to the open market space module. Customers that have the power to make their product adoption decisions and cooperative competitors signify an unrestricted market space.

Two variables load on the third factor. The first variable is “competitor delayed nonresponse.” The second variable is “customer prompt product endorsement.” Both variables describe the opportunities and threats that a new entrant could face in the marketplace. Competitors that initially disregard venture (and give it time to strengthen), and customers that quickly embrace a venture’s product both refer to the new entry module.

“Management flexibility, creativity and trustworthiness” is the only variable that has loaded on the fourth factor. This can be explained by that the variable specifies whether a venture’s management will be able to adjust to the changing market conditions in a creative fashion, honestly report all the information to its investors, and is able to reverse its prior decisions if they turn out to be incorrect. No wonder this factor stands somewhat apart for instance from the variables pertaining to the strategy formulation and execution module. Essentially, it brings up the fact that some changes in a venture’s strategic direction may need to be undertaken later on, and thus relates to the “future adjustment module.”

The variable “competitor retaliation expected” loads on the fifth factor. Tables 3 and 4 indicate that this variable is rather weakly correlated with all the other variables in the dataset. In fact, this is the only variable that conveys some negative information regarding the future. Overall, the respective factor relates to the “competitive threat module.”

The variable “sector dominance” loads on the sixth factor. It is weakly correlated with the other two variables that relate to business plan. Overall, it appears that this variable points to a different factor that can be described as the “market share module.” In a large and rapidly growing marketplace, “sector dominance” is tantamount to profitability.

The variable “competitor nonresponse due to own problems” loads on the seventh factor. Importantly, this variable has a dual meaning. On the one hand, it is closely related to the variable “competitor delayed response.” A competitor that has its own problems (Chen et al., 1992) will be less likely to retaliate. On the other hand, if

competitors face problems that could also indicate that the marketplace itself may be unsatisfactory in some ways. Thus, this variable relates to the “hidden market flaws module.”

**Table 3. Means, Standard Deviations, and Correlations: Pre-Investment Stage**

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Sector dominance	0.72	0.13												
2. Management flexibility	0.66	0.13	0.21											
3. Customer concern management	0.58	0.09	0.26	0.38*										
4. Competitor delayed response	0.53	0.12	-0.14	-0.19	-0.28									
5. Competitor retaliation expected	0.45	0.10	-0.03	0.09	0.25	-0.05								
6. Winning product-market strategy	0.63	0.12	0.46**	0.37*	0.59***	-0.22	0.10							
7. Customer prompt product endorsement	0.69	0.11	0.43**	0.42**	0.30	-0.30	0.13	0.64***						
8. Management sector knowledge	0.67	0.13	0.34*	0.28	0.54***	-0.10	0.09	0.62***	0.38*					
9. Competitor nonresponse due to own problems	0.58	0.10	-0.05	0.15	-0.17	0.42**	0.00	0.21	0.08	0.04				
10. Customer market power to make product adoption decisions	0.57	0.08	0.13	0.30	0.09	0.31	-0.12	0.31	0.41*	0.11	0.33*			
11. Competitor collaboration expected	0.56	0.08	0.10	0.01	0.09	0.28	-0.10	0.394	0.31	0.33*	0.42**	0.61***		
12. Superior business model	0.66	0.12	0.31	0.28	0.57***	-0.03	0.23	0.75***	0.51***	0.82***	0.31	0.23	0.43**	
13. Great management team	0.63	0.13	0.14	0.50***	0.54***	-0.13	0.21	0.51***	0.23	0.55***	0.14	-0.05	0.01	0.65***

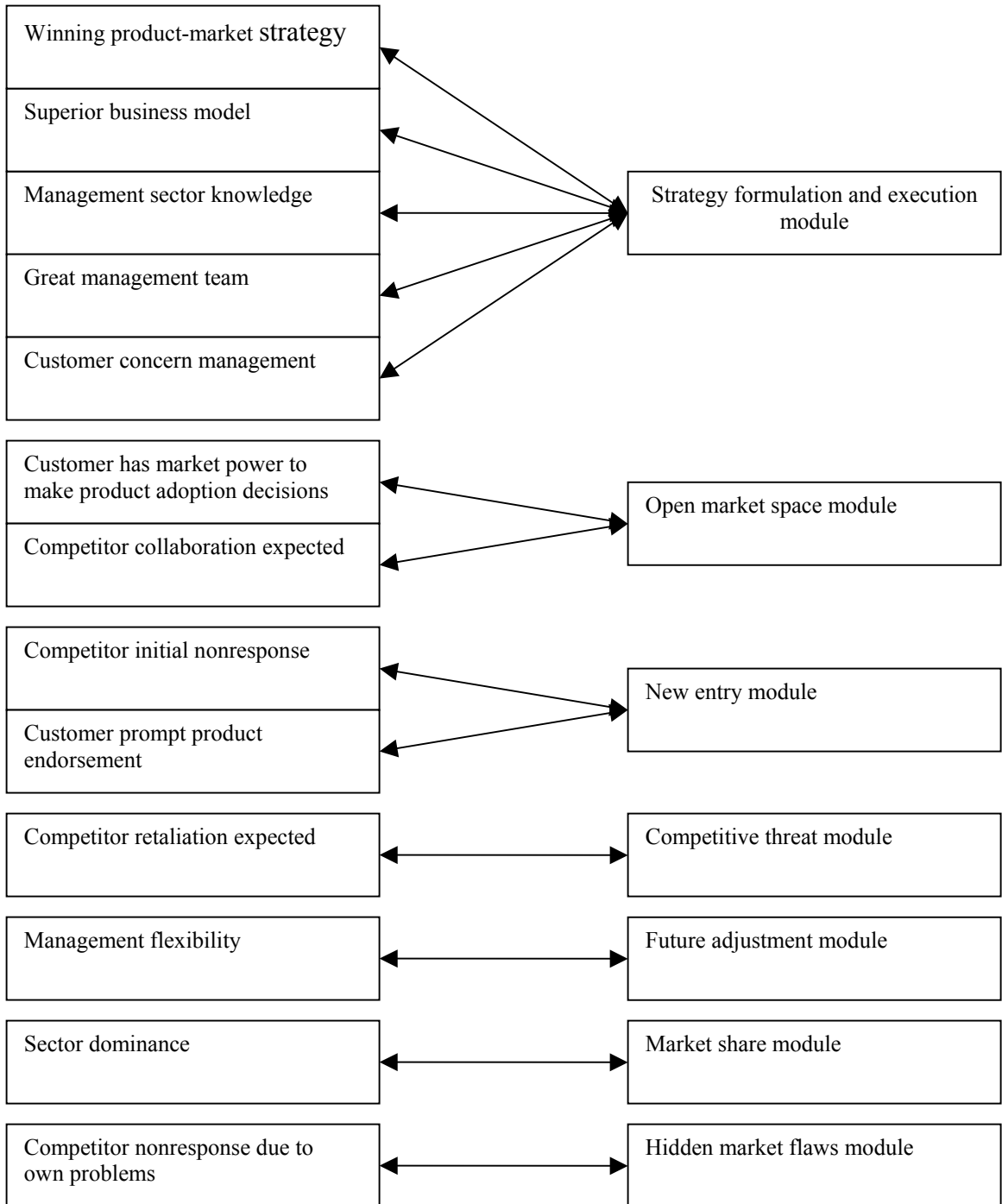
\*p < .05, \*\* p < .01, \*\*\* p < .001

**Table 4. Means, Standard Deviation, and Correlations: Post-Investment Stage**

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Sector dominance	0.77	0.12												
2. Management flexibility	0.70	0.14	0.23											
3. Customer concern management	0.62	0.15	0.23	0.6089***										
4. Competitor delayed response	0.61	0.13	0.36*	0.4203**	0.6111***									
5. Competitor retaliation expected	0.50	0.10	0.20	0.27	0.16	0.30								
6. Winning product-market strategy	0.73	0.13	0.3848*	0.6209***	0.6472***	0.6062***	0.3603*							
7. Customer prompt product endorsement	0.76	0.12	0.4915**	0.4838**	0.4758**	0.5383***	0.24	0.785***						
8. Management sector knowledge	0.69	0.15	0.3795*	0.6667***	0.511***	0.6026***	0.21	0.6771***	0.64					
9. Competitor nonresponse due to own problems	0.62	0.13	0.346*	0.554***	0.4856**	0.696***	0.4206**	0.6381***	0.54	0.6442***				
10. Customer market power to make product adoption decisions	0.57	0.09	0.10	0.4112**	0.03	0.10	0.4522**	0.18	0.07	0.15	0.31			
11. Competitor collaboration expected	0.62	0.12	0.22	0.27	0.25	0.3279*	0.24	0.3515*	0.45	0.3566*	0.3561*	0.4222**		
12. Superior business model	0.73	0.12	0.3791*	0.4974**	0.5472***	0.6616***	0.06	0.7112***	0.72	0.6758***	0.578***	-0.17	0.3305*	
13. Great management team	0.66	0.14	0.07	0.6498***	0.4114**	0.5033***	0.05	0.5171***	0.45	0.6763***	0.4323**	0.20	0.15	0.5297***

\*p < .05, \*\* p < .01, \*\*\* p < .001

**Figure 5. Condensed Results of Factor Analysis**



## The Principal Hypothesis Test

I utilized the results of factor analysis to test the principal hypothesis presented in this dissertation. Thus, I averaged the means of the five variables pertaining to “strategy formulation and execution module” at the pre-investment and post-investment stage, and conducted a t test. Respectively, I averaged the means of the two variables relating to “open market space module” and the two variables relating to “new entry module” at the pre-investment and post-investment stage, and conducted a t test. I also conducted a t test of the four single-item variables each pertaining to a separate factor (“competitive threat module,” “future adjustment module,” “market share module” and “hidden market flaws module”).

The t tests showed that there was a significant difference between all these factors at the pre-investment and post-investment stage. Thus, VCs evaluated the impact of all the seven factors on the likelihood of venture funding much higher at the post-investment stage. This supports the principal hypothesis advanced in this dissertation that since VCs have more information and contextual knowledge of a venture and its environment at the post-investment stage compared to the pre-investment stage they will interpret the same positive information more positively at the post-investment stage than at the pre-investment stage, and will be more likely to provide a venture with additional than initial funding.

Cronbach’s alpha of the first factor (“strategy formulation and execution module”) indicates that the variables measuring this type of uncertainty are strongly correlated.





**Table 5. T Test of the Factors Influencing VCs' Financing Decisions at the Initial (Pre-Investment) and Follow-on (Post-Investment) Stages.**

Investment Criteria	Initial Stage (Means)	Follow-on Stage (Means)	Difference	Standard error of difference	Initial Stage standard deviation	Follow-on Stage Standard deviation	t statistic
<b>Factor 1: Strategy formulation and implementation uncertainty:</b>							
1. Winning product-market strategy.							
2. Superior business model							
3. Management has a superior knowledge and understanding of its sector.	.632	.685	-.053	.01	.099	.114	-5.36***
4. Great management team.							
5. Customer concern management							
<b>Factor 2: Open market space uncertainty</b>							
1. Customer market power to make product adoption decisions	.565	.596	-.031	0.12	.072	.091	-2.52*
2. Competitor collaboration expected							
<b>Factor 3: New entry uncertainty</b>							
1. Competitor delayed response	.613	.682	-.069	.018	.067	.112	-3.89***
2. Customer prompt product endorsement							
<b>Factor 4: Competitive threat uncertainty</b>							
Competitor retaliation expected	.452	.504	-.052	.017	.097	.105	-3.01**
<b>Factor 5: Future adjustment uncertainty</b>							
Management flexibility, creativity and trustworthiness	.663	.698	-.036	.016	.135	.145	-2.27*
<b>Factor 6: Market share uncertainty</b>							
Sector dominance	.722	.769	-.047	.017	.130	.115	-2.82**
<b>Factor 7: Hidden market flaws uncertainty</b>							
Competitor nonresponse due to own problems	.575	.624	-.049	.020	.103	.134	-2.41*

\*p < .05

\*\* p < .01

\*\*\* p < .001

Factor 1: Average interitem correlation: 0.6145 (.5904)

Cronbach's alpha: 0.8885 (8782)

## CHAPTER 6: DISCUSSION

Initial research on VCs' investment criteria (Tyebjee and Bruno, 1984; MacMillan et al., 1985; 1987; Fried & Hisrich, 1994; Muzyka et al., 1996) has identified management-related investment criteria (management competence, track record, functional skills, commitment, balanced management team); market-related criteria (market size, market attractiveness, market growth rate; access to market); product-related investment criteria (product uniqueness, functional prototype; superior product); risk-related criteria (investment risk, competitor risk, management risk, inexperience risk, implementation risk, viability risk, exit risk) and finance-related investment criteria (deal, returns).

However, several groups of authors (Sandberg et al., 1988; Hall & Hofer, 1993; Shepherd, 1999; Shepherd et al., 2000) have pointed to the limitations of research based on VCs' self-reports as leading to discovery of "espoused" criteria rather than "in use" criteria (Shepherd & Zacharakis, 1998). These researchers also called on colleagues to use theories derived from strategy and economics for understanding VCs' decision making.

Responding to this call, I introduced a number of investment criteria based on broader strategic and economic approaches such as "the customer's perspective" (Kaplan & Norton, 1996; 2006), "competitor delayed response" (Chen, Smith, Grimm, 1992); "competitor nonresponse (Chen & MacMillan, 1992); "competitor retaliation" Ferrier & Smith, 1999; Smith, Grimm, Lee, 2006), and "competitor collaboration" (Child & Faulkner, 1998; Subramani & Venkatraman, 2003).

Factor analysis showed that the classification of investment criteria into thematic groups utilized in this dissertation (business-plan related variables, management-related variables, customer-related variables and competitor-related variables) as well as in prior research (Tyebjee & Bruno, 1984; MacMillan et al., 1985; 1986) represents an oversimplification.

For instance, two business plan related variables (“winning product-market strategy” and “superior business model”), two management related variables (“management sector knowledge” and “great management team) and one customer-related variable (“customer concern management”) were strongly correlated with each other (Table 3), and demonstrated both convergent and discriminant validity. An important conclusion following from this is that VCs utilize their investment criteria in an integrative fashion. All these five variables are essential for strategy formulation and execution, and this is why VCs conceive of this group of variables as constituting one factor.

The results of a t test comparing VCs’ ratings of the seven factors identified in this dissertation by means of factor analysis have demonstrated that there are some important differences between VCs’ decision to provide a venture with initial funding (at the pre-investment stage) and additional funding (at the post-investment stage). In their interviews, most VCs have pointed out that they are more likely to reinvest than to invest in a company since they have more available information and contextual knowledge about its situation.

Some VCs, however, have also emphasized their emotional commitment to portfolio companies, and, hence, their unwillingness to deny them support even when the

performance is worse than expected. This supports prior research (Ryan, 1998; Guler, 2003; Birmingham et al., 2004) which has discovered that VCs may be prone to escalation of commitment.

Other VCs have explained the higher likelihood of reinvestment compared to the initial investment by how syndicate agreements are structured. VCs that do not continue financing a company often see their initial investment diluted, and even become worthless. This makes it harder for VCs to decline further participation in a venture's financing.

#### Limitations

One limitation of this thesis is that it relies on information reported by VCs. Previously, several scholars (Sandberg et al., 1986; Hall, 1989; Hall and Hofer, 1993) have criticized studies based on VCs' self reports. In this thesis, however, I sought to circumvent this limitation by asking VCs to assess the likelihood of their investment based on some new information they received after having completed the initial due diligence. This procedure forced VCs to compare their investment criteria to one another in terms of their incremental value. Another limitation of this dissertation is that it utilized single items to evaluate several modules that have been uncovered by way of factor analysis.

#### Future Research

Future research may begin with exploring the types of uncertainty revealed in this study with the help of factor analysis, and try to identify a larger number of investment criteria directly related to the respective modules. That would allow overcoming the limitation of this study that uses single items to measure four of the modules.

## Conclusions

The study has supported the principal hypothesis advanced in this dissertation that due to more available information and broader contextual knowledge of the circumstances surrounding a venture VCs are more likely to assess the same positive information more positively at the post-investment stage than at pre-investment stage, and thus be more likely to provide a portfolio company with subsequent than initial financing.

Interviews with VCs conducted along with the survey of VCs' investment criteria have established that in addition to more available information at the post-investment stage, escalation of commitment and the structure of syndicate agreements may play a role in making additional financing of portfolio companies more likely than their initial funding.

Appendix A

**INFORMED CONSENT FORM**

<p><i>Project Title</i></p>	<p><b>The Primary Factors Influencing Venture Capitalists’ Reinvestment Decisions</b></p>
<p><b>Why is this research being done?</b></p>	<p>This is a research project being conducted by Dmitry Khanin, a Doctoral Student at the University of Maryland, College Park. I am inviting you to participate in this research project (part of my doctoral dissertation) because you are a venture capitalist or an entrepreneur who can help me with your professional knowledge of the venture capital industry and/or entrepreneurial ventures. The purpose of this research project is to examine what factors influence venture capitalists’ decisions to provide (or discontinue) financing of their portfolio companies.</p>
<p><b>What will I be asked to do?</b></p>	<p>The procedures involve taking part in an interview. The interview will take approximately one hour. I will come to your office and ask you a series of questions. The questions are related to venture capitalists’ reinvestment decisions.</p> <p>Some sample questions are:</p> <p>What are the most valuable resources that an entrepreneur (venture capitalist) can bring to the table?</p>

	<p>What are the more important considerations that may influence a VC's decision to pull the plug on the company (or scale down its involvement with it)?</p> <p>What factors would make a VC decide to give the portfolio company more time (and/or funding) despite its unsatisfactory performance?</p> <p>What are some of the reasons that an entrepreneur may have second thoughts about its involvement with a particular venture firm, and start looking for ways of discontinuing that relationship?</p> <p>The interview will be recorded in its entirety.</p>
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<p><b>What about confidentiality?</b></p>	<p>I will do my best to keep your personal information confidential. To help protect your confidentiality, I will take the following steps: Within two days after I interview you, I will download the interview from a DVR (a digital voice recorder) to my office computer, and transcribe it. After that, I will download both the audio file and the Word document with the transcribed interview on a CD, and bring the CD to the locked file cabinet in Dr. J. Robert Baum's office. As soon as I do that, I will immediately erase the audio file both from the DVR and my office computer. I will also erase the Word document with the transcribed text of the interview from my office computer. Only Professor Baum and I will have access to the CD. Five years after the last article based on this research is published all the files will be erased from the CD.</p> <p>Also, to preserve your confidentiality, (1) your name will not be included on the surveys and other collected data; (2) a code will be placed on the survey and other collected data; (3) only through the use of an identification key, will I be able to link your survey to your identity; and (4) I alone will have access to the identification key.</p> <p>If I write an article about this research project, your identity will be protected to the maximum extent possible. Your</p>
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	<p>information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if I am required to do so by law.</p>
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<b>Project Title</b>	The Principal Factors Influencing Venture Capitalists' Reinvestment Decisions
<b>What are the risks of this research?</b>	<p>There may be some risks from participating in this research study. There is a potential risk that the relationship between a venture capitalist and its portfolio company can be damaged if some information revealed by one of the parties could be passed on to the other party. Another possible risk would occur if interviewees' competitors (or sensationalist journalists) got access to my files. To guard from these hazards, I request that the interviewees not mention either their own names or names of their firms or their portfolio companies during the interview. I will also ensure that I do not pass on information from one party to the other. My role in the interview process is restricted to asking questions. Finally, all my files will be coded (and I alone will have access to the key identifying participants by name), and will be stored in secure locations.</p>

<p><b>What are the benefits of this research?</b></p>	<p>This research is not designed to help you personally, but the results may help the investigator learn more about how venture capitalists and entrepreneurs assess their partners' resources and capabilities and the possibility of a productive cooperation with each other. I will inform the participants about the results of my research upon request. I hope that, in the future, other people might benefit from this study through improved understanding of how venture capitalists make reinvestment decisions, and how venture capitalists and entrepreneurs can make their relationship work.</p>
<p><b>Do I have to be in this research?</b> <b>May I stop participating at any time?</b></p>	<p>Your participation in this research is completely voluntary. You may choose not to take part at all. You may also choose not to answer some or any questions. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.</p>

<p><b>What if I have questions?</b></p>	<p>This research is being conducted by Dmitry Khanin, a Doctoral Student in the Management &amp; Organization Department of the R.H. Smith School of Business at the University of Maryland, College Park under the guidance of Dr. J Robert Baum, an Associate Professor in the Management &amp; Organization Department of the R.H. Smith School of Business at the University of Maryland, College Park. If you have any questions about the research study itself, please contact J. Robert Baum, Department of Management &amp; Organization, R.H. Smith School of Business, University of Maryland; Tel.: 301-405-3908; jrbaum@rhsmith.umd.edu</p> <p>If you have questions about your rights as a research subject or wish to report a research-related injury, please contact: Institutional Review Board Office, University of Maryland, College Park, Maryland, 20742; (e-mail) <a href="mailto:irb@deans.umd.edu">irb@deans.umd.edu</a>; (telephone) 301-405-0678</p> <p>This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.</p>
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<b>Project Title</b>	The Principal Factors Influencing Venture Capitalists' Reinvestment Decisions	
<b>Statement of Age of Subject and Consent</b>	Your signature indicates that: you are at least 18 years of age; the research has been explained to you; your questions have been fully answered; and you freely and voluntarily choose to participate in this research project.	
<b>Signature and Date</b>  [Please add name, signature, and date lines to the final page of your consent form]	<b>NAME OF SUBJECT</b>	
	<b>SIGNATURE OF SUBJECT</b>	
	<b>DATE</b>	

APPENDIX B

INTERVIEW SCRIPT

Part I. Initial Investment

Suppose you are faced with a venture that you are 50% likely to finance and 50% likely not to finance. What is the likelihood that you will decide to invest in a venture provided that you have just obtained some additional information which changed your beliefs regarding the venture in the following way?

1/ you now believe in the venture's ability to dominate its sector in the immediate future (the sector is sufficiently large and rapidly growing).

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

2/ you now believe that the senior management of the venture is flexible, creative and trustworthy.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

3/ you now believe that the senior management recognizes the concerns that the customer may develop about the venture's product or service and proposes some reasonable tactics that will help allaying such potential customer concerns.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

4/ you now believe that competitors will initially ignore the venture's entry and, thus, give it enough time to grow.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

5/ you now believe that the competitors will eventually launch some retaliatory actions but only once they begin to recognize that the venture has become much more competitive.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

6/ you now believe that the venture has chosen a winning product-market strategy.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

7/ you now believe that the customer will quickly embrace the venture's product or service.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

8/ you now believe that the venture's senior management has a superior knowledge and understanding of its sector.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

9/ you now believe that the competitors already operating in the sector are experiencing some serious problems, and may not represent a significant threat at least in the short-run.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%  
70%\_75%\_80%\_85%\_90%\_95%\_100%

10/ you now believe that the customer is not locked into agreements with other suppliers and can make its own decisions with regard to the adoption of the venture's products.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%  
70%\_75%\_80%\_85%\_90%\_95%\_100%

11/ you now believe that the competitor operating in the sector will be interested in collaborating with the venture in the near future.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%  
70%\_75%\_80%\_85%\_90%\_95%\_100%

12/ you now believe that the venture's business concept is far superior to the business concepts of its incumbent competitors operating in the sector.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%  
70%\_75%\_80%\_85%\_90%\_95%\_100%

13/ you now believe that the choice of the venture for financing is justified given what you have found out about the senior management's ability to work together as a team.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%



70%\_75%\_80%\_85%\_90%\_95%\_100%

## Part II. Additional Considerations at the Initial Investment Stage

Suppose you are faced with a venture that you are 50% likely to finance and 50% likely not to finance. What is the likelihood that you will decide to invest in a venture provided that you just obtained some additional information which changed your beliefs in the following way?

1/ you believe that the venture will become very successful if you will have a chance down the road to replace its senior management that may not be sufficiently qualified for running such a business.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

2/ you believe that the venture will become very successful if you will have a chance to change its strategic direction or significantly transform its business concept.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

3/ you believe that you could exit this investment early since it appears as a very likely acquisition target.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

4/ you believe you could retain your role as the lead investor in financing the venture in subsequent rounds.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

5/ as a potential co-investor, you trust the due diligence of the lead investor and would like to cooperate with the lead investor on this project

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

### Part III. Subsequent Rounds of Investment or Reinvestment

Suppose you are faced with a venture to which you are 50% likely to provide and 50% likely not to provide additional financing. What is the likelihood that you will decide to reinvest in a venture given that you have just obtained some additional information which changed your prior beliefs regarding the venture in the following way?

1/ you now believe that the venture is likely to dominate its sector in the immediate future (the sector is sufficiently large and rapidly growing).

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

2/ you now believe that the senior management of the venture is flexible, creative and trustworthy based on how it has resolved some of the venture's difficult problems in the past.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

3/ you now believe that the senior management has early recognized some concerns that the customer has initially developed about the venture's product or service and has proposed some reasonable tactics that helped allaying the customer's initial concerns.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

4/ you now believe that competitors will continue to ignore the venture's existence for some time and, thus, will give it some more time to strengthen.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

5/ you now believe that the competitors will eventually launch some retaliatory actions.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

6/ you now believe that the venture has demonstrated that it has a winning product-market strategy.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

7/ you now believe that the customer will continue to embrace the venture's product or service.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

8/ you now believe that the venture's senior management has a superior knowledge and understanding of its sector as shown by its recent actions.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

9/ you now believe that the competitors already operating in the sector are experiencing some serious problems, and may not represent a significant threat at least in the short-run.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

10/ you now believe that the customer has not become locked into agreements with other suppliers and can continue making its own decisions with regard to the adoption of the venture's products.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

11/ you now believe that the competitor operating in the sector has expressed some genuine interest in collaborating with the venture.

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

12/ you now believe that the venture's business concept is far superior to the business concepts of its incumbent competitors operating in the sector.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

13/ you now believe that the choice of the venture for financing is justified given what you have found out about the senior management's ability to work together as a team.

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

#### Part IV. YOUR VC FIRM'S STRATEGIES

1a. Some VC firms prefer to get deeply involved in management of their portfolio companies; others prefer to give the senior management more leeway. On a scale from 0% (a hands-off investor) to 100% (a hands-on investor) where would you place your VC firm?

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

How many times per month do you visit a portfolio company if you are the responsible partner and your firm is the (1b) lead investor \_\_\_\_\_, (1c) coinvestor \_\_\_\_\_?

How many times per month do you visit a portfolio company if you a senior partner and your firm is the (1d) lead investor \_\_\_\_\_, (1e) coinvestor \_\_\_\_\_?

How many times per month do you talk on the phone with the portfolio company's senior management if you are the responsible partner and your firm is the (1f) lead investor \_\_\_\_\_, (1g) coinvestor \_\_\_\_\_?

How many times per month do you talk on the phone with the portfolio company's senior management if you are a senior partner and your firm is (1h) the lead investor \_\_\_\_\_, (1i) coinvestor \_\_\_\_\_?

2a. Some VC firms regard the decision criteria they use in deciding whether to invest (or reinvest) in a venture as nonnegotiable. Others are likely to make trade-offs. On a scale from 0% (the criteria we use are nonnegotiable) to 100% (all and any criteria can be adjusted depending on the circumstances) where would you place your VC firm?

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

2b. In what percentage of cases, did you make the decision to invest in a venture even though you had some doubts about at least one of the decision making criteria you use?

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

3a. Do you prefer to serve as the lead investor in the first round? In what percentage of syndicated ventures over the last five years have you lead in the first round?

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

3b. If you served as the lead investor in the first round, in what percentage of ventures were you also the lead investor in the second round?

0% \_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

3c. If you were not the lead investor in the first round, in what percentage of ventures were you also the lead investor in the second round?

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

3d. If you make an initial investment of X dollars, what percentage of X do you put in reserve for future rounds?

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%\_200%\_300%\_400%\_500%

4a. On a scale from 0% to 100% where 0% signifies that no collaboration with co-investors is desired (we are only looking for partners who will contribute sufficient funds) and 100% signifies that rich collaboration with co-investors is desired (we want our syndicate partners to play a significant role in the governance process) where would you place your VC firm?

0%\_5%\_10%\_15%\_20%\_25%\_30%\_35%\_40%-45%-50%\_55%\_60%\_65%%

70%\_75%\_80%\_85%\_90%\_95%\_100%

#### Part V. HYPOTHETICAL EXIT DECISIONS

Suppose there are two portfolio companies that you have initially regarded as being identical candidates for reinvestment. Specifically, you were 50% likely to reinvest and 50% likely not to reinvest in either company. Then you obtained some additional information regarding the second company. How would the following

information change the likelihood of your reinvestment in a venture provided that initially you were 50% likely to reinvest, and 50% likely not to reinvest.

You consider the following actions with regard to the venture and you are empowered to implement any of these choices:

*a/ give the company more time to come up with better solutions to its problems;*

*b/ replace the senior management;*

*c/ change the strategic direction;*

*d/ stop financing the company and stay on as a passive investor;*

*e/ seek to sell the company or your stake in the company.*

What is the likelihood that you will choose one of these above-mentioned options given that you have discovered the following drawbacks?

Va. Your portfolio company A seems to be hitting its targets. However, its business concept appears less attractive than when you initially decided to invest, and you are having increasing doubts concerning the venture's ability to seize a dominant position in its sector. Assuming that you are empowered to make the changes listed below what is the likelihood that you will endorse them?

1. Continue financing, and give the management more time to sort things out

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

2. Continue financing, but replace the senior management

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

3. Continue financing but change the venture's strategic direction



0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

4. Discontinue financing, and stay on as a passive investor.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

5. Discontinue financing, and seek to sell the company or your stake in it.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

Vb. Your portfolio company B has so far performed well but you believe that it could have performed much better had it not been for its senior management's lack of flexibility and creativity. Assuming that you are empowered to make the changes listed below what is the likelihood that you will endorse them?

1. Continue financing, and give the management more time to sort things out

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

2. Continue financing, but replace the senior management

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

3. Continue financing but change the venture's strategic direction

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

4. Discontinue financing, and remain a passive investor.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

5. Discontinue financing, and seek to sell the company or your stake in it.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

Vc. Your portfolio company C has experienced some problems, it has not reached its targets, and you believe that this happened because the business concept itself has turned out to be less attractive than the senior management and you have initially believed. To add insult to injury, the senior management has not been sufficiently flexible and creative which made the company C's situation even more challenging. Assuming that you are empowered to make the changes listed below what is the likelihood that you will endorse them?

1. Continue financing, and give the management more time to sort things out

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

2. Continue financing, but replace the senior management

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

3. Continue financing but change the venture's strategic direction

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

4. Discontinue financing, and remain a passive investor.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

5. Discontinue financing, and seek to sell the company or your stake in it.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

Vd. Your portfolio company D has failed to reach its targets, and you believe that the reason for its unsatisfactory performance is that the customer has developed some serious concerns as to whether it makes sense for them at the present stage to endorse

company D's product or service. Assuming that you are empowered to make the changes listed below what is the likelihood that you will endorse them?

1. Continue financing, and give the management more time to sort things out

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

2. Continue financing, but replace the senior management

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

3. Continue financing but change the venture's strategic direction

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

4. Discontinue financing, and remain a passive investor.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

5. Discontinue financing, and seek to sell the company or your stake in it.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

Ve. Your portfolio company E has reached its milestones, but just recently the company E's competition has embraced a much more aggressive strategy toward company E which, in your opinion, will undercut company E's (and the entire sector's) profitability in the future. Assuming that you are empowered to make the changes listed below what is the likelihood that you will endorse them?

1. Continue financing, and give the management more time to sort things out

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

2. Continue financing, but replace the senior management

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

3. Continue financing but change the venture's strategic direction

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

4. Discontinue financing, and remain a passive investor.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

5. Discontinue financing, and seek to sell the company or your stake in it.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

V f. Your portfolio company F has done well up to this point. However, you believe that the customer has recently slowed its orders of the company E's products due to some doubts it has developed about its performance characteristics. At the same time, the competition has targeted the company's sector which, in your estimation, will undercut its profitability for the years to come. Assuming that you are empowered listed below what is the likelihood that you will endorse one of them?

1. Continue financing, and give the management more time to sort things out

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

2. Continue financing, but replace the senior management

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

3. Continue financing but change the venture's strategic direction

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

4. Discontinue financing, and remain a passive investor.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

5. Discontinue financing, and seek to sell the company or your stake in it.

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

## PART VI. ACTUAL EXIT DECISIONS

During the last five years, what is the percentage of the following exit decisions that your venture capital firm has chosen?

1. the percentage of your portfolio companies that have exited via an IPO?

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

2. the percentage of portfolio companies that have been acquired (or merged) at an early stage of their operations?

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

3. the percentage of portfolio companies that have been acquired (or merged) at a late stage of their operations?

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

4. the percentage of portfolio companies that you stopped financing due to your concerns about their ability to achieve success in accordance with your guidelines?

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

5. the percentage of portfolio companies in which you were initially the lead investor, but later your share got crammed down?

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

6. the percentage of portfolio companies in which you initially invested, but were later able to sell your stake to the senior management of the company?

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

7. the percentage of portfolio companies in which you initially invested, but were later able to sell your stake to other investors?

0%- 5-10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100%

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