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THE EARLY LIFE OF A NEW VENTURE: AN ANALYSIS OF ENTREPRENEURS' STRATEGIC DECISIONS AND STAKEHOLDERS' ASSESSMENTS

By

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ABSTRACT

THE EARLY LIFE OF A NEW VENTURE: AN ANALYSIS OF ENTREPRENEURS' STRATEGIC DECISIONS AND STAKEHOLDERS' ASSESSMENTS

Young Rok Choi

As an emerging field of research, entrepreneurship needs to incorporate knowledge developed in neighboring fields of social science to better explain the entrepreneurial phenomena. Such a practice can be used to increase our understanding of entrepreneurs' and stakeholders' decision-making of starting, exiting, and growing a business. It can also be utilized to deepen our understanding of a decision maker's perceptions on risk - - in particular the mortality risk of new ventures. By using a decision-making perspective this dissertation attempts to develop a useful framework to understand the entrepreneurial process and important events such as new ventures' exploration and exploitation. To do so, I adopt the notions of the liability of newness and the honeymoon period from the literature on population ecology, and adapt these notions to the individual/firm level of analysis.

The liability of newness is the aspect of a new venture that might cause its higher mortality risk relative to an established venture (examples of measurement include firm age). In Chapter 2, the liability of newness is further dimensionalized and examined from a stakeholders' perspective using a verbal protocol analysis. The literatures on structural inertia in population ecology as well as institutional theory and behavioral theory suggest four dimensions of the liability of newness - - reliability, accountability, legitimacy, and commitment. From a verbal protocol analysis, eleven stakeholders representing potential

employees, customers, distributors, and bankers are found to perceive liability from a new venture in the above four dimensions. Different stakeholders perceive the liability of newness differently: customers focused on reliability; potential employees frequently mentioned (pragmatic) legitimacy and accountability; distributors are mostly concerned about reliability, accountability, and legitimacy; while bankers focused on accountability and (moral) legitimacy. Stakeholders' perception of the liability of newness appears to be negatively related to their decision on the involvement with the new venture (e.g., employment, purchasing, distribution contract, and loan). The perspective of stakeholders who possess resources is critical to the survival of the new venture. Therefore, the dimensions of the liability of newness examined with key stakeholders well represent the notion of the mortality risk of a new venture.

To further investigate the role of mortality risk in an entrepreneur's growth investment decision (i.e., exploitation), I propose in Chapter 3 a dynamic analytical method and derive an optimal timing for a new venture's exploitation investment. This analytical model optimizes two main conflicting forces in the entrepreneurial process: begin exploiting earlier to increase profit potential or continue exploring to reduce mortality risk. Since uncertainty is the driving force of mortality risk as well as profit potential, the notion of an uncertainty threshold is proposed as the decision criterion for exploitation timing. Model parameters reflecting structural properties of knowledge creation and imitation in the entrepreneurial process affect the exploitation timing decision. In particular, the model prescribes that exploration cost, influence of lead time on profit potential, and marginal effect of time on mortality risk are positively related to the exploitation timing. The importance of mortality risk in the performance function is

shown to be negatively related to the exploitation timing. The uncertainty reduction per unit of knowledge is both positively and negatively related to the exploitation timing, as the direction of its influence is determined by the relative impact of this factor on the reduction in mortality risk and profitability.

Chapter 4 examines whether the risk perspective does influence entrepreneurs' decision making of their own exploitation investment. I perform a conjoint analysis with 55 independent entrepreneurs in high-tech industries. In this conjoint analysis, each dimension of the liability of newness proposed in Chapter 2 are further specified to provide respondents (to be here the entrepreneur rather than various stakeholders) a more concrete meaning of each dimension. The results show that a new venture's dimensions of the liability of newness - - e.g., endogenous technological uncertainty, managerial capability, customer acceptance, and supporters' commitment - - are negatively associated with the entrepreneur's exploitation decision. Following the lead time argument of the entry strategy literature, an entrepreneur's likelihood of exploitation is found to be low in situations where the threat of imitation is high. Entrepreneurs appear to be subject to the influence of the internal and external contexts of the entrepreneurial initiative - - a new venture's exploration period and financial market attractiveness are positively associated with the exploitation decision. The influence of internal and external contexts on the exploitation decision indicates a possibility of decision biases in the entrepreneur's decision policy. Entrepreneurs also appear to adopt contingency decision policies: the relative influence of attractive financial market is found higher in situations where the threat of imitation is high, whereas the relative influence of a lower liability of newness is found higher in situations where the threat of imitation is low.

This dissertation makes a number of contributions to the literature. First, new venture exploitation (an important entrepreneurial event) is better understood, and depicted in a more parsimonious manner, from building on notions from the population ecology literature (i.e., the liability of newness and the honeymoon period). Second, the role of mortality risk in new opportunity exploitation is better captured via an analytical framework, allowing an explicit consideration of changes in uncertainty over time. This framework also provides useful prescriptions for the optimal timing of exploitation. Third, the conjoint analysis on entrepreneurs' exploitation decision generates insights on their decision factors and the manner in which they resolve the trade-off between high profitability and high mortality risk in early market entry. This conjoint analysis is the very first attempt to empirically investigate the entrepreneurial exploitation phenomenon. Finally, the literature-driven dimensions of the liability of newness and its relevance examined through stakeholders' and entrepreneur's decision making studies may be expected to form the basis for interesting future research focused on the early stages of a new venture's life.

CHAPTER 1: INTRODUCTION AND HISTORICAL REVIEW

Our understanding of the phenomenon of entrepreneurship has lacked a conceptual framework (Shane & Venkataraman, 2000). Applying current knowledge in management and related social science disciplines is insufficient for us to understand and predict the unique phenomenon created by the entrepreneurs and the entrepreneurial ventures. For example, in strategic management, scholars are most interested in explaining variations in relative performance of established organizations and pay little attention to issues of survival for newly established ventures. Survival or reducing mortality risk is a salient concern to entrepreneurs, which should be included in their strategic decisions.

Yet our systematic knowledge on the entrepreneurial processes of starting, exiting, and growing a business is limited (Bhidé, 2000). Life cycle theory is confined by its own limitations of rigid determinism and fails to explain how and why the transition between the adjacent two stages in the model occurs. The theory does not explain when the process of development stops for a particular venture and how long it takes progress from one stage to another. Also, overlooked is the significant role of the entrepreneurs and stakeholders in the process of life cycle.

Entrepreneurs work to ensure the long-run survival of their ventures rather than just immediate profit performance (Rothschild, 1947). This makes an investigation of new venture survival and failure important for understanding how ventures grow into successful established firms. The importance of entrepreneurship for creating new economic value needs to be examined in the context of this high rate of failure that has

persisted for decades, as well as in the context of rapid growth of new entrepreneurial ventures. Therefore, one needs to consider both mortality risk and growth phenomena at the same time.

In developing a useful framework to understand the entrepreneurial processes reflecting both mortality risk and growth of new ventures, I note that Shane and Venkataraman (2000) recommend for scholars to focus on what neighboring disciplines do not explain in entrepreneurial phenomena. The evolutionary perspective, particularly population ecology, is one of these close disciplines studying the phenomenon of high failure rates found during the entrepreneurial process. It provides many useful notions such as the liabilities of newness and adolescence that can be applied to entrepreneurship. However, in entrepreneurship there has been only limited effort to actively adopt knowledge from population ecology mainly due to the difference in the level of analysis between the two disciplines. But previous theory building attempts in entrepreneurship acknowledge its value (Aldrich, 1990; Van de Ven, Hudson, & Schroeder, 1984). An attempt to assimilate such useful knowledge developed in population ecology at an individual/firm level of analysis is needed.

1.1 RESEARCH QUESTIONS

One obstacle that entrepreneurship scholars may face in using concepts from population ecology is the lack of specification in the imported constructs - - likely the result of its more macro perspective. As population ecologists use finer concepts at the macro perspective, their ability to directly measure the concepts decreases significantly. For example, the question of why new organizations fail at a greater rate than do more established ones is the thesis of the liability of newness (Stinchcombe, 1965). However,

there has been little effort to define what dimensions behind the construct of the liability of newness exist and they do not measure the construct in a direct way. They use firm age as the proxy for the construct. Thus, it is unclear whether the liability of newness exists and influences the mortality of new ventures until it is measured, especially from a stakeholder (resource providers) perspective.

Early in the entrepreneurial process, mortality risk is greatest.[1] How do both entrepreneurs and stakeholders assess the new venture's mortality risk? One way to address this important question is using the notion of the liability of newness. A coarse specification of the liability of newness blocks us from improving our understanding of entrepreneurs' behavior early in the entrepreneurial process. To the author's knowledge, there is no research that attempts to measure and relate the liability of newness to the mortality risk at the individual level of analysis.[2] As a first step to grasp (assimilate and recreate) greater understanding of the notion of the liability of newness in entrepreneurship, an exploratory research from stakeholders' viewpoint is needed. Thus,

> Research Questions Set #1: What characteristics of a venture's newness do key stakeholders assess in deciding whether to develop and maintain a relationship with it? Are all characteristics associated with newness liabilities or are some of them assets? Do all stakeholder groups use the same assessment policy, or does the relative importance of certain characteristics differ for different groups? How do these characteristics affect stakeholders' decisions?

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[1] Due to the presence of the honeymoon period in the earliest stage of the entrepreneurial process, mortality risk during this period is very low, as revealed in the thesis of the liability of adolescence (Brüderl & Schüssler, 1990; Levinthal & Fichman, 1988).

[2] A possible exception is a theoretical framework proposed by Shepherd, Douglas and Shanley (2000).

If most of the dimensions of newness are liabilities and contribute to increased mortality risk, it indicates that entrepreneurs need to set aside time during which they can reduce the level of the liabilities of newness and thereby reduce mortality risk in further stages of its life cycle. Do entrepreneurs organize the entrepreneurial process in this way? Population ecology studies provide such evidence at the population level.

Population ecology studies provide several different mortality patterns of organizations over time, which may provide an important clue to enhance our understanding of the early entrepreneurial process and entrepreneurs' decision making. Research into the liability of newness proposes a monotonically decreasing mortality pattern over time, which has been supported by empirical studies of populations of organizations (Carroll, 1983; Carroll & Delacroix, 1982; Freeman, Carroll, & Hannan, 1983; Mitchell, 1994; Singh, Tucker, & House, 1986) - - new ventures lack established rules, lack trust among members, and lack external relations with customers and suppliers, whereas established firms have overcome technical and market-related start-up problems by creating effective routines (Dougherty, 1990; Hannan & Freeman, 1989; Jovanovic, 1982; Lippman & Rumelt, 1982; Nelson & Winter, 1977; Quinn & Cameron, 1983).

In addition to a monotonically decreasing mortality pattern consistent with that of the liability of newness, recent empirical research provides evidence of a nonmonotonic mortality pattern (Brüderl & Schüssler, 1990; Henderson, 1999; Levinthal & Fichman, 1988) - - there is initially a period of low mortality, followed by a rapid rise in mortality and then a decline in mortality (the decline is consistent with the liability of newness). The initial low mortality period is often referred to as a *honeymoon period* (Brüderl &

Schüssler, 1990; Fichman & Levinthal, 1991). A proposed explanation for the honeymoon period (and therefore against a monotonic decline in mortality) is that new ventures are born with some initial endowments (physical and psychological) that sustain the new organization for a period of time (Brüderl, Preisendorfer, & Ziegler, 1992; Fichman & Levinthal, 1991). Furthermore, decisions regarding the likely success or failure of a business are postponed for a period until sufficient information has been gathered to allow for an assessment to be made (Brüderl & Schüssler, 1990). That is, the honeymoon is a phenomenon partly resulting from entrepreneurs' information gathering and information processing on the viability of the new venture. Once the viability of a new venture has been affirmed and the option to build exercised, one can expect that the new venture will be managed differently. March (1991) proposes that organizations have two general approaches to investment: 1) the exploration of new possibilities and 2) the exploitation of old certainties. Drawn on March (1991), I define *exploration* in the entrepreneurial process as activities and/or investments for reducing technological and market uncertainties involved in the new opportunity. *Exploitation*, on the other hand, is defined as activities and/or investments committed to gain returns by building efficient business operational systems. The honeymoon period is primarily a time for exploration of possibilities for the venture. After the honeymoon, the focus shifts to the exploitation of the possibilities revealed during the honeymoon.

The decision of when to stop its focus on exploration by ending the honeymoon period and begin a focus on exploitation is essential for a new venture's survival and profitability. Entrepreneurs can increase profit potential by capitalizing on first mover advantages with exploitation, but they also reduce the new venture's mortality risk by

further exploring the opportunity and thereby reducing its liabilities of newness.[3] In the decision dilemma situation (trade-off between mortality risk and potential profitability), which is common in the entrepreneurial process, it is unclear when is optimal to make the exploitation decision. This discussion leads to the next research question:

> Research Question #2: When is the optimal time to change the new venture's focus from exploration to exploitation in the entrepreneurial process in order to maximize performance (i.e., optimize the trade-off between potential profitability and mortality risk)?

An analytical approach (thus providing a conceptual model) to this question - - optimal stopping - - is expected to generate insights on the underlying nature of exploitation in the entrepreneurial process.

In the situation where there exists the trade-off between mortality risk and potential profitability with regard to the exploitation timing, the next important question becomes "how does entrepreneurs' perception of the liability of newness influence their decision of new opportunity exploitation during the entrepreneurial process?" A major stream of research in strategic management is to explain firm performance and survival by examination of the top management decision making process, or strategic choice (Child, 1972; Schwenk, 1988; Stubbart, 1989). The factors that affect strategic choice are therefore of central concern, and a large body of work has explored the determinants and processes of strategic decision making. However, in the entrepreneurship literature the examination of entrepreneurs' strategic choice during the entrepreneurial process has been largely ignored. The question of when and why entrepreneurs commence further

[3] This issue is detailed in Chapter 3.

investment for exploitation is an important issue for entrepreneurship, since it is closely related to the outcomes of an entrepreneurial initiative (e.g., entrepreneurial rents and failure). Thus,

Research Questions Set #3: What factors influence entrepreneurs' exploitation decision? How do entrepreneurs resolve the trade-off between mortality risk and profitability involved with the exploitation decision in the entrepreneurial process?

A decision analysis to this question - - conjoint analysis - - is expected to generate insights on the understanding of the new venture's strategic actions in the entrepreneurial process through entrepreneurs' decision making.

The intent here is to make progress on a number of fronts in entrepreneurship research. First, it is believed that adopting notions from the population ecology and other related discipline (e.g., organization theory) literatures help us to further understand the entrepreneurial process through investigating entrepreneurs' decisions on the important entrepreneurial event (exploitation) and to depict it in a more parsimonious manner. Second, it is believed that the analytical approach to understand the role of the mortality risk in new opportunity exploitation provides useful prescriptions for the optimal timing and shows the usefulness of an analytical method approach to investigate an entrepreneurial phenomenon. Third, it is believed that the conjoint analysis on entrepreneurs' exploitation decision generates insights on their decision factors and the ways that they resolve the trade-off between the two performance measures of new ventures (i.e., profitability and mortality risk). The conjoint analysis in this dissertation is the very first attempt to investigate the entrepreneurial exploitation phenomenon.

Finally, the literature-driven dimensions of the liability of newness and its relevance examined through stakeholders' and entrepreneur's decision making studies may be expected to form the basis for interesting future research focused on the early stages of a new venture's life.

1.2 APPROACH AND ORGANIZATION OF THE DISSERTATION

This dissertation explores a number of issues surrounding an entrepreneur's decisions that impact a new venture's chances of survival and growth, by adopting constructs (i.e., the liability of newness and honeymoon period) developed in neighboring disciplines and applying them to the individual venture level of analysis. Different aspects of these themes, related to the events in an early entrepreneurial process, require a different research approach and method. Consequently, the present dissertation contains self-contained chapters addressing each research question, respectively. This organizing method appears the most appropriate way to communicate the individual and joint contribution of this thesis.

This dissertation is organized as follows. Chapter 2 proposes the dimensions of the liability of newness drawn from population ecology, institution, and organization theory, and presents results of stakeholders' assessments on a venture's newness. Due to the exploratory nature of the issue, verbal protocol analysis is used. Chapter 3 further focuses research attention on the timing issue of entrepreneurs' growth investment (exploitation) in the early entrepreneurial process. Since there is a need for further theorizing on the exploitation decision using a dynamic perspective, a mathematical formulation that captures this dynamic perspective is used. Chapter 4 investigates entrepreneurs' decision policy on the exploitation. A conjoint experiment is used to

capture the decision policies of a sample of technological entrepreneurs. Chapter 5 discusses the theme over and above each of the individual steps and the implications of the results to scholars and practitioners.

CHAPTER 2: STAKEHOLDERS' ASSESSMENT OF A NEW VENTURE

Overview of Chapter 2

New ventures have a greater mortality risk than do established businesses. This is often labeled the "liability of newness", but there has been little investigation of the underlying dimensions of this liability. This Chapter proposes four such dimensions: reliability, accountability, legitimacy, and commitment. Using a verbal protocol analysis, I explore how four groups of stakeholders (potential employees, customers, distributors, and bankers) differ in their perception of these dimensions, and how their perceptions affect their decisions. I also identify two asset dimensions of newness, positive pragmatic legitimacy and positive affective commitment.

This Chapter proceeds as follows: I first review the literatures from population ecology and institutional and behavioral theory, and propose a theoretical framework for the liability of newness. Second, I explore this theoretical framework from different stakeholders' perspectives and propose a number of propositions. Third, as an exploratory attempt to investigate the research questions, I use a verbal protocol analysis. I explain the research method and detail the findings. The implications of the theoretical model and the findings are discussed in Chapter 5.

2.1 INTRODUCTION

Most new ventures fail within a short period of time. Timmons (1994), for example, reports that 23.7% of small businesses are dissolved in the first two years, 51.7% within four years, and 62.7% within six years. While it is difficult to establish the exact percentage of new ventures that fail or the timing of failure, there is considerable

evidence from a population level of analysis that the rate is lower among established businesses - - empirical studies have identified decreasing mortality patterns with age for several organizational populations (Freeman, Carroll, & Hannan, 1983; Hannan & Freeman, 1989; Mitchell, 1994; Singh, Tucker, & House, 1986).[4] Why do new ventures face a greater mortality risk than do established businesses?

To describe this high mortality risk, Stinchcombe (1965) introduced the concept of the "liability of newness". This liability appears to derive partly from firm-internal factors such as the costs of learning new tasks, the strength of conflicts regarding new organizational roles, and the presence or absence of informal organizational structures (Singh et al., 1986; Stinchcombe, 1965). However, it has also been proposed that external factors contribute to a new venture's mortality risk. Various forms of barriers to entry - - established firms' brand recognition and market acceptance, illegitimate acts by competitors, and workforce characteristics - - make it difficult for new ventures to mobilize and acquire resources (Aldrich & Auster, 1986). Singh et al. (1986) propose that stable links with key stakeholders are important for a firm's survival chances and that new ventures have greater difficulty in establishing such links than do established firms (see also Freeman, 1984).

What characteristics of a new venture do key stakeholders assess in deciding whether to develop and maintain a relationship with it? How do these characteristics affect stakeholders' decisions? Are all characteristics associated with newness liabilities

[4] There is evidence of a period of adolescence early in the venture's life when it faces no risk of failure because insufficient time has elapsed for performance to be accurately assessed.

or are some of them assets? Do all stakeholder groups use the same assessment policy, or does the relative importance of certain characteristics differ for different groups?

In this Chapter we take a first step in exploring these important questions. Past research has produced a list of different factors that may contribute to a new venture's mortality risk. This Chapter provides a parsimonious theoretical model that combines these previously independent findings on new venture failure and also accommodates the perspectives of outsiders.

2.2 DIMENSIONS OF THE LIABILITY OF NEWNESS

To investigate the liabilities of newness, I begin by asking, what are the assets of maturity? According to the principles of structural inertia in population ecology (Hannan & Freeman, 1984) as well as institutional theory (Meyer & Zucker, 1989; Suchman, 1995) and behavioral theory (Becker, 1960; O'Reilly & Chatman, 1986), established organizations possess four characteristics that positively influence their survival: reliability, accountability, legitimacy, and commitment.

2.2.1 Reliability and Accountability

Established organizations have more structural inertia than do new ventures. Structural inertia provides reliability and accountability through processes of institutionalization and by creating highly standardized routines (Hannan & Carroll, 1995; Hannan & Freeman, 1984). Reliability is *a firm's capacity to repeatedly produce a number of products at a given quality with low variance in performance* (Hannan & Carroll, 1995; Hannan & Freeman, 1984). Reliability is an important attribute for any business, and "given uncertainty about the future, potential members, investors, and

clients might value reliability more than efficiency" (Hannan & Carroll, 1995: 20). For example, chain-affiliated hotels use standard service to reduce consumers' uncertainty about the quality of rooms and service (Ingram, 1996). Restaurant franchises similarly trade on high reliability, whether real or perceived. Real estate agencies provide another example. Even though homeowners and buyers could save substantial money by conducting transactions themselves, few do so without involving real estate agents (Hannan & Carroll, 1995).

Accountability is *the firm's ability to document how resources have been used and to reconstruct the sequences of organizational decisions, rules, and actions that produced particular outcomes* (Hannan & Carroll, 1995; Hannan & Freeman, 1984). Hannan and Carroll (1995) insist that people favor procedural rationality and that formal organizations excel at rendering procedurally rational accounts. Testing for accountability is especially intense during organization building (e.g., the process of initial resource mobilization). Potential employees want assurance that their investments of time and commitment will not be wasted and that careers within the organization will be managed in some rational way; potential investors (or supporters) want a measure of managerial capability and trustworthiness (Hannan & Carroll, 1995; Hannan & Freeman, 1984).

New ventures seem to have lower levels of reliability and accountability than their more established counterparts. It takes time to establish and learn organization-specific skills and routines (Nelson & Winter, 1982). It is harder to create new routines than continue existing ones, because initially there is much learning by doing and comparison among alternatives (Nelson & Winter, 1982). New ventures must hire high-caliber

employees, establish social relations among strangers, develop roles and routines, and overcome novel production and management problems (Aldrich & Auster, 1986; Shepherd, Douglas, & Shanley, 2000; Singh et al., 1986; Stinchcombe, 1965). Therefore, they will tend to exhibit both low reliability and low accountability.

2.2.2 Legitimacy

Since new ventures lack historical performance (Rao, 1994), legitimacy is critical if entrepreneurs are to attract resources from outside the organization (Hunt & Aldrich, 1986). Organizational legitimacy consists of *the institutional support of powerful external actors* (Starr & MacMillan, 1990) *with intangible assets determining the ability of organizations to garner capital and personnel* (Rao, 1994). Legitimacy has three dimensions: cognitive, pragmatic, and moral (Suchman, 1995).

The cognitive legitimacy of a new venture is *the extent of stakeholders' knowledge and understanding of a given organization's activity, including its new products*. One can assess cognitive legitimacy by measuring the level of public knowledge about a new activity. The highest form of cognitive legitimacy is achieved when a new product, process, or service becomes taken for granted. In general, new products, organizations, and industries tend to show low cognitive legitimacy. Without cognitive legitimacy, entrepreneurs may have difficulty gaining and maintaining the support of key constituencies (Aldrich & Fiol, 1994), because a lack of knowledge increases uncertainty about decisions, and people are typically uncertainty averse (Kahneman & Tversky, 1979).

Pragmatic legitimacy rests on *the self-interested calculations of an organization's most immediate audiences* (Suchman, 1995: 578). Here again, uncertainty is important:

if stakeholders are unable to perceive clear benefits from dealing with a new venture, they will decline to do so. For example, new ventures may find it difficult to attract qualified employees (Aldrich & Auster, 1986), and venture capitalists typically avoid investments in seed-stage ventures (Fiet, Busenitz, Moesel, & Barney, 1997), as the potential gains are highly uncertain.

Moral legitimacy, also called sociopolitical legitimacy, is *the positive normative evaluation (i.e., perceived rightness) of the organization and its activities, given existing norms and laws of stakeholders* (Aldrich & Fiol, 1994; Suchman, 1995). Since profit-seeking activities are widely perceived as valid (Delacroix, Swaminathan, & Solt, 1989), most new ventures are not actively challenged as morally illegitimate. However, to procure resources, entrepreneurial firms must rely on social networks and meet the norms and expectations of those networks (Reynolds, 1991; Larson & Starr, 1993; Starr & Fondas, 1992; Stone & Brush, 1996). As organizations age, they develop stronger exchange relationships with other organizations, becoming members of the legitimate networks in the community and gaining the endorsement of powerful collective actors. Older organizations thus experience increased access to public and official resources, reduced selection pressures, and, in turn, increased chances of survival (Singh et al., 1986). One can measure moral legitimacy by assessing public acceptance of an industry, government subsidies to the industry, or the public prestige of its leaders (Aldrich & Fiol, 1994). At the individual firm level, one can measure moral legitimacy by assessing how a new venture satisfies existing decision rules and the criteria of stakeholders.

2.2.3 Commitment

Commitment is an essential ingredient for successful long-term relationships (Gundlach, Achrol, & Mentzer, 1995). Hannan and Freeman (1984) and Meyer and Zucker (1989) have noted that even poorly performing organizations are sometimes "propped up" by a strong and somewhat irrational commitment on the part of stakeholders. The organizational behavior literature recognizes two types of commitment, affective and instrumental. Affective commitment involves acceptance of organizational goals and values, a willingness to exert effort for the organization, and a strong desire to be a part of the organization (Mowday, Porter, & Steers, 1982). It includes psychological attachment, identification, affiliation, and value congruence (Allen & Meyer, 1990; O'Reilly & Chatman, 1986). From a customer's perspective, affective commitment can imply the acceptance of values provided by the new product. Instrumental (behavioral) commitment involves continuing the relationship and complying with organizational rules largely in response to cost/benefit analyses (Becker, 1960; Morris & Sherman, 1981). This view regards commitment as a calculated act (Becker, 1960). The committed party stakes something of value on consistent future behavior - - a side bet (Becker, 1960). Decisions that are not supported by such side bets either crumble in the face of opposition or else fade away. The instrumental view of commitment is similar to social exchange theory, which states that social and/or working relationships develop through stages of increasingly rewarding mutual exchanges (Gabarro, 1987). Since instrumental commitment relies on already committed side bets, it is rarely found in the new venture context.

New organizations begin with some level of commitment from stakeholders, especially affective commitment. However, initial commitments, even when well intentioned, do not always lead to long-lasting and successful relationships (Gundlach et al., 1995). Hannan and Freeman (1984) argue that unreliability and failure of accountability at any stage in a subsequent lifetime threaten an organization's ability to maintain the commitment of members and clients and its ability to acquire additional resources. The literature, then, suggests that reliability, accountability, legitimacy (cognitive, pragmatic, and moral), and commitment (affective and instrumental) are related to the liability of newness. I now examine more specifically how these factors appear to various stakeholders, and how they affect stakeholders' interactions with new ventures.

2.3 STAKEHOLDERS' ASSESSMENTS AND DECISION MAKING

A stakeholder is *"any group or individual who can affect or is affected by the achievement of the organization's objectives"* (Freeman, 1984: 46). A narrower definition is *"those groups without whose support the organization would cease to exist"* (SRI, 1963: quoted in Freeman, 1984: 31). The key stakeholders of a new venture at founding and during the initial stages of its life include (i) customers, (ii) employees, (iii) distributors, and (iv) financiers.

2.3.1 Customers' Assessment of Newness

Customers generally do not have complete information about a product or service. For instance, durability can seldom be observed directly. The same is true for other aspects of "quality" - - serviceability, conformation, reliability, features, and perceived

performance (Garvin, 1987). Consequently, customers rely on heuristic decision rules or signals such as images, advertising, and brand names.

Brand or image research in marketing suggests that customers' knowledge about a company (i.e., corporate association) can influence their beliefs about and attitudes toward its new products (Aaker, 1996; Brown & Dacin, 1997; Keller, 1993). In particular, "corporate ability association" (perceptions of a company's expertise) may have a great impact on perceptions of specific product attributes (Brown & Dacin, 1997). People may associate the quality of goods in a new product line with the quality of a company's established products. In the early 1980s, Maytag introduced a new line of dishwashers. Salespeople immediately emphasized the product's reliability - - not yet proven - - because of the reputation of Maytag's clothes washers and dryers (Garvin, 1987). As new ventures have little product history, customer evaluations may be unfavorable even if actual quality is acceptable. Further, in a study of discontinuous (radical) new products, Veryzer (1998) proposes that what the new products are offering does not fit with the customers' knowledge structure or consumption patterns, which leads customers to overestimate trivial negative attributes so that they reject the products. Thus,

> **Proposition 2.1:** *Customers perceive newer ventures to have lower reliability (product quality) and lower cognitive legitimacy and therefore have less affective commitment to the venture and/or its products.*

2.3.2 Potential Employees' Assessment of Newness

In evaluating the attractiveness of an organization and job, potential employees consider many factors, including pay, type of work, benefits, job security, location,

promotion policies, and working conditions (Pesek, Farinacci, & Anderson, 1995/1996). But, initial application processes, which affect subsequent decision alternatives and outcomes (Gatewood, Gowan, & Lautenschlager, 1993), are heavily based on general impressions of organizational attractiveness, such as "organizational image" (Rynes, 1991). So are early job choice decisions (Fombrun & Shanley, 1990; Gatewood et al., 1993). Factors associated with corporate image include familiarity, knowing someone in the company, and using the company's products and services. Prior exposure to the company appears to enhance image and job application probability. These findings suggest that new ventures may have difficulty attracting high-caliber employees.

Pay stability as well as pay level is important for employees, because they are less able to diversify their risks than are the principals of a business. In contingent pay systems, moreover, employees may be at the mercy of factors beyond their control, such as an unstable economic situation (Cable & Judge, 1994). Thus, job seekers generally prefer fixed pay, whereas new ventures, which tend to have unstable cash flows and limited financial resources, may prefer to offer variable pay. Further, since new ventures lack established, routine personnel and promotion policies, potential employees will also be more uncertain about their career development than they would if employed by an established organization. Thus,

Proposition 2.2: *Potential employees perceive newer ventures to have lower cognitive legitimacy, pragmatic legitimacy and accountability.*

2.3.3 Distributors' Assessment of Newness

Firms need to contract with other companies to obtain raw materials and resources, and to distribute products. Contracting norms influence exchange activities

and behaviors, whether the contract itself is discrete (a single contract between unrelated parties, the abstract prototype widely used in microeconomics) or relational (a contract involving parties with ongoing relationships, which often reflects elements apart from the exchange activity itself) (Macneil, 1980; Nevin, 1995). As relational contracts are more typical in the real world than discrete ones, in general potential contracting partners prefer doing business with established firms (Hudson & McArthur, 1994). Distributors, for example, may have little information about the new venture's market strategy, which may not fit the distributor's own target market. As the new venture has no track record, its distributors will need more complete contractual terms and monitoring efforts, which raise transaction costs. Even for a first-time contract, parties that are both members of the same network will know each other's industry position and managers' reputations for integrity (Hudson & McArthur, 1994). New ventures outside the network may be perceived as illegitimate contract partners. Furthermore, decision routines within the distributor's operations may be incompatible with what the new venture can offer, for instance, contract requirements such as salesperson training. Thus,

Proposition 2.3: *Distributors perceive newer ventures to have lower cognitive legitimacy, pragmatic legitimacy, moral legitimacy and accountability.*

2.3.4 Bankers' Assessment of Newness

A considerable number of studies have investigated venture capitalists' decision criteria (MacMillan, Siegal, & SubbaNarasimha, 1985; Shepherd, 1999; Tyebjee & Bruno, 1984). Here, instead, I focus on banks. New firms, generally, have difficulty raising debt capital (Levie & Warhuus, 1998), because depository institutions typically require several years of financial history for a business borrower to qualify for credit

(Cole & Wolken, 1995; Levie & Warhuus, 1998; Starr & MacMillan, 1990). Nevertheless, international data show that banks still are a main source of financial resources for new ventures (Reynolds & White, 1997).

Substantial information asymmetry typically remains between entrepreneurs and bankers (Sharpe, 1990), particularly in the situation where there is little operating history and high uncertainty. This can give rise to "adverse selection" and "moral hazard" problems for the lending institution. Therefore, bankers impose monitoring and bonding costs on entrepreneurs (Jensen & Meckling, 1976; Levie & Warhuus, 1998), which means bankers pay higher transaction costs for new ventures than for established firms. This argument suggests that bankers would perceive new ventures as having low accountability and perhaps low pragmatic legitimacy. Thus,

Proposition 2.4: *Bankers perceive newer ventures to have lower pragmatic legitimacy, moral legitimacy, and accountability.*

As shown in Table 2.1, one can map the differences in newness perception made by different stakeholders. Table 2.1 shows that the literatures of different management fields implicitly included the notion of the liability of newness. It also exhibits that different stakeholders may emphasize different dimension of newness. Below I further investigate that the perceived liability of newness will be associated with stakeholders' decision on the involvement with the new venture.

Table 2.1: A Map of the Liability of Newness and Stakeholder Groups

Dimensions of Newness	*Stakeholder Groups*			
	Customer	Employee	Distributor	Banker
Reliability	Lower			
Accountability		Lower	Lower	Lower
Cognitive Legitimacy	Lower	Lower	Lower	
Pragmatic Legitimacy		Lower	Lower	Lower
Moral Legitimacy			Lower	Lower
Affective Commitment	Lower	Lower		

2.3.5 Assessment of Newness and Decision Making

Making decisions is a complicated process that is difficult to explain with a simple theory. The decision-making literature, however, suggests that stakeholders' perceptions of a new venture can influence their decisions, for the following reasons: First, reliability, accountability, legitimacy and commitment seem to be associated with perception of risk. Second, emotions both affect and are affected by decisions (Mellers, Schwartz, & Cooke, 1998). Negative affect leads to a failure to search for new alternatives (Fiedler, 1988) and people with negative affect make more attribute-based comparisons than alternative-based comparisons (Luce, Bettman, & Payne, 1997). I suggest that stakeholders who perceive a great liability of newness and high risk also likely feel negative affect. In contrast, for example, stakeholders who perceive positive pragmatic legitimacy (i.e., something in it for them) may also feel positive emotions toward the new venture. Finally, values or beliefs such as utility are essential ingredients of choice (Edwards, 1961). Negative utility caused by a greater liability of newness will lead to rejection decision. Thus,

Proposition 2.5: *Stakeholders who perceive a higher liability of newness (lack of reliability, accountability, legitimacy, and commitment) will more likely reject the offer to be involved with the new venture than other stakeholders who perceive a lower liability of newness.*

2.4 AN EXPLORATORY STUDY: A VERBAL PROTOCOL ANALYSIS

2.4.1 Methods

This Chapter used protocol analysis (Ericsson & Simon, 1993) to identify the dimensions of the liability of newness from a stakeholder's perspective. In verbal protocol analysis, people are asked to think aloud while making decisions or judgments. This method is based on the assumption that verbal behavior is a type of recordable behavior that can be analyzed like any other behavior (Ericsson & Simon, 1993). Verbal protocol analysis has been extensively used in decision-making research in entrepreneurship and management fields (e.g., Ball et al., 1998; Hall & Hofer, 1993; Harrison, Dibben, & Mason, 1997; Sarasvathy, Simon, & Lave, 1998; Schweiger, 1980). It is particularly applicable to this Chapter's research questions as the concept of a venture's newness involves the perceptions and thought processes of key decision makers.

2.4.1.1 Sample and Procedure

To elicit the verbal protocols, I asked individuals to make decisions concerning affiliation (as employees, customers, distributors, lenders) with a hypothetical new venture on the basis of a profile I provided (see Appendix A). The profile (for a new manufacturer of communication equipment for home businesses) was derived from a real

venture profile published in *Inc.* magazine and consisted of three pages of information (including the decision questions and interview guidelines). Interviewees were asked to "think aloud" into a tape recorder as they made their decision. To represent the various stakeholder groups, I used a sample of individuals drawn from New York state's Capital Region: three graduate students to serve as potential employees, three home business owners as potential customers, two telecommunication equipment distributors, and three bankers (see Table 2.2 for characteristics of the sample).

Table 2.2: Profiles of the Sample

Stakeholder Group	Brief Profile
Customers	Owner of a graphic design company
	Owner of a home business
	Owner of a human resource consulting firm
Potential Employees	Second year MBA student
	Second year graduate student in electronics
	Second year graduate student in joint Law & MBA degree program
Distributors	Manager of a local telecom equipment distribution firm
	Vice president of a local telecom equipment distribution firm
Bankers	Branch manager of a national bank
	President of a local bank
	Vice president of a business development corporation

2.4.1.2 Data Coding and Reliability

Verbatim transcriptions of the protocols were coded and divided into thought segments, following guidelines in Ericsson and Simon (1993) and Smith (1971), which emphasize the actual content of the verbalizations rather than assuming that clauses, sentences, or phrases represent independent units. This was necessary because participants showed different patterns of speech and/or thought.

While attempting to code the thought segments into the six dimensions proposed above, I found that *additional dimensions* were also being used by the stakeholders. These additional dimensions are positive pragmatic legitimacy and positive affective commitment (the opposites of lack of pragmatic legitimacy and lack of affective commitment). Some stakeholders perceived benefits from the new and innovative attributes of the products - - a positive pragmatic legitimacy. Some stakeholders also appeared to actively appreciate the values of the new venture's new way of doing business and displayed willingness to be part of the new venture - - a positive affective commitment. For them, newness is not a liability but an asset. I coded these "*assets of newness*" as additional dimensions of newness, rather than integrating them into the corresponding liability dimensions with opposite values, in order to separate them for the analyses that follow.

Therefore, the thought segments in each protocol were classified either into one of the dimensions of newness or into a "Miscellaneous" category. The thought segments obtained from the sample seemed consistent with the theoretical framework proposed in the previous section and with our explanations on the assets of newness. I assigned each stakeholder one of three nominal decision outcomes (1 for an obvious acceptance and -1 for an obvious rejection, while 0 was assigned for a neutral or conditional decision). In order to test the reliability of coding, two doctoral students in management independently judged four verbal protocols, which were randomly selected from the total of eleven verbal. The percentage of agreement (POA) between the raters and the first author was .847. Since the dimensions of newness used in this Chapter are conceptual, the two raters and the first author, after independent ratings, had a subsequent discussion to clarify the

definitions of the dimensions and reached a POA of .902. Hall and Hofer (1993) reported a POA of .907 in their study of venture capitalists' assessments. In general, POA reliability below .70 is considered poor and above .85 is very satisfactory (Gellert, 1955).

2.4.1.3 Analysis

Since the sample size (N=11) is small, I do not apply any sophisticated statistical analysis. Instead, I provide verbal thoughts that indicate both the proposed dimensions of the liability of newness and dimensions of the assets of newness that were identified *ex post*. I show correlation coefficients and some descriptive statistics. The frequencies of the thought segments were used to examine the salience of each dimension. Since the number of thought segments differed among decision makers in the experiment (range was 17 ~ 79 segments with a mean of 33.4 segments), in order to make sure that each stakeholder had the same influence in the analysis I assigned each thought segment a weight determined by one over the stakeholder's total number of thought segments. For example, if customer 1 had 30 thought segments, each thought segment had 1/30 weight.

2.4.2 Results

2.4.2.1 Dimensions of Newness

Both the liability and asset dimensions seem to form part of stakeholders' assessments about the new venture, as each dimension explains a substantial portion of the thought segments, ranging from 69% (banker 3) to 93% (customer 3). As displayed in Table 2.3, thought segments obtained from the sample seemed consistent with the theoretical framework proposed in the previous section and with our explanations on asset aspects of newness.

Table 2.3: Proposed Dimensions of the Newness and Verbal Protocols

Dimensions	Supporting Literature	Supporting Verbal Protocols
Lack of Reliability	- Given uncertainty about the future, potential members, investors, and clients might value reliability more than efficiency (Hannan & Carroll, 1995). - New ventures face novelty in production (the extent to which the production technology of the new product or service is similar to existing production technologies) (Shepherd et al., 2000).	- I would like to try it first on a trial basis. [customer] - How expandable it is. [customer] - I mean every product, especially new product you've got -- if you're talking about beta units in the field, this is a new product, is going to have problems, no matter how much testing you put out there. [distributor] - The first ones to go out are going to have software glitches and problems. [distributor] - They sound good on paper, but when you really get down to it, they do what they say, but not maybe all that well or that reliably. [distributor]
Lack of Accountability	- The process of inventing new roles, the determination of their mutual relations and of structuring the field of rewards and sanctions, have high costs in time, worry, conflict, and temporary inefficiency (Stinchcombe, 1965). - New organizations must rely heavily on social relations among strangers. Relations of trust are much more precarious in new than old organizations (Stinchcombe, 1965). - Members learn mutual coordination of roles (Singh et al., 1986) - New organizations need to discover the most cost-effective and efficient ways of operating (from plant layout to incentive systems) (Aldrich & Auster, 1986; Stinchcombe, 1965).	- From a distributor's point of view, if you're looking for us to become a partner to distribute these products, we want to know a little bit more about the founders and the financing. [distributor] - I guess getting back to my responsibilities, as an engineer there, it'd be interesting to see how extensive [employee] - In looking at this, I guess I just don't trust the manufacturer of it or the catalog company [customer] - A critical component is whether or not the company manufactures their own materials and boxes. Or whether or not they have outsourced companies working for them. [banker]

Table 2.3 (cont.): Proposed Dimensions of the Newness and Verbal Protocols

Dimensions	Supporting Literature	Supporting Verbal Protocols
Lack of Cognitive Legitimacy	- Low brand recognition and market acceptance of products (Aldrich & Auster, 1986) - Novelty in consumption (customers do not know about information of new products) (Shepherd et al., 2000). - One can assess cognitive legitimation by measuring the level of public knowledge about a new activity (Aldrich & Fiol, 1994).	- Would I need special faxes and phone, because this is a proprietary system? [distributor] - Well, I don't know what's the second product line? [customer] - I don't know of any other products in the marketplace that really handle that -- at least through hardware. [customer] - They just start technology and capability with acknowledge. [employee] - This is a fairly new product, and it's something that has not proven yet in the market. [banker]
Lack of Pragmatic Legitimacy	- The self-interested calculations of an organization's stakeholders (Suchman, 1995). - New ventures' potential members, customers, or sponsors must believe that belonging to, buying from or supporting that organization involvement is in their interest (Barron, 1998).	- In my small business, I don't really need this. [customer] - The projected losses in the first year [banker] - There's also no discussion as to competitors for similar types of products. [banker] - That tarnishes our reputation, potentially. [distributor] - My margins might be pretty lousy, unless you're going to give me an awful big discount off list price. [distributor] - How extensive the medical coverage is and what not is all a factor. [employee]
Lack of Moral Legitimacy	- Normative evaluation (i.e., rightness) of the organization and its activities given existing norms and laws of stakeholders (Aldrich & Fiol, 1994; Suchman, 1995). - Compatibility or accordance, which explains the different rate of innovation adoption, is the degree to which an innovation is perceived as being consistent with the existing values, past experiences (Rogers, 1996; Veryzer, 1998).	- Lenders are not in a position to take, or absorb, any of the risk associated with a start-up venture. [banker] - I mean, is that our market? [distributor] - So, for me, this would really be quite a change. And I'm not sure it's a change that I would particularly feel comfortable with. [customer]

Table 2.3 (cont.): Proposed Dimensions of the Newness and Verbal Protocols

Dimensions	Supporting Literature	Supporting Verbal Protocols
Lack of Affective Commitment	- Pressures for commitment to attract and retain employees, friends, and business associates (Aldrich et al., 1987; Stone & Brush, 1996).	- I don't think I'd really want to turn my car into a home office phone. [customer] - Um, and, I don't think that I would want my employees to feel that they had something around all the time like this. [customer] - Just one product. I really don't feel comfortable with this. [employee] - Technology industry on the whole tends to be somewhat riskier than your other industries, in a lender's mind, or an underwriter's mind. [banker]

With reliability concerns of the product, one customer stated that: "I would like to try it first on a trial basis." An example of a thought segment indicating a customer's assessment of a new venture's lack of cognitive legitimacy is: "I don't know of any other products in the marketplace that really handle that - - at least through hardware." Among many example statements for pragmatic legitimacy, one customer exclaimed that "... I don't really need this."

However, a potential employee appreciated the possible opportunity that may be found in the new venture, saying that "I could grow with that company if it's successful." A potential employee concluded that they would not join the new venture saying that "Just one product. I really don't feel comfortable with this." On the other hand, other potential employees perceived positive affections with the new venture profile and expressed it with "Looks like a good idea" and "I could become part of it."

A vice president of a distribution company expressed his concern over a new venture's accountability: "From a distributor's point of view, if you're looking for us to become a partner to distribute these products, I want to know a little bit more about the founders and the financing". The president of a local bank expressed their position on moral legitimacy with a statement that "Lenders are not in a position to take, or absorb, any of the risk associated with a start-up venture."

To be useful, dimensions of a construct should be exclusive and independent to make the dimensions useful (Chrisman, Hofer, & Boulton, 1988). In this Chapter, the small sample size made it difficult to apply multivariate statistical methods to test for independence among the proposed dimensions. One basic way to do this is to investigate the bivariate Pearson correlation matrices among the dimensions (see Table 2.4). Most

correlations in Table 2.4 are low and insignificant, indicating that the dimensions are likely independent. [5]

Table 2.4: Means, Standard Deviations, and Bivariate Correlations

Dimensions of newness	Mean	s.d.	1	2	3	4	5	6	7	8
1. Lack of Reliability	.047	.106								
2. Lack of Accountability	.181	.172	-.390							
3. Lack of Cognitive Legitimacy	.089	.115	.125	-.347						
4. Lack of Pragmatic Legitimacy	.173	.098	.459	-.070	.217					
5. Lack of Moral Legitimacy	.122	.142	-.134	-.146	-.175	-.081				
6. Lack of Affective Commitment	.039	.088	-.201	.171	-.018	-.098	.099			
7. Positive Pragmatic Legitimacy	.069	.171	-.190	-.374	-.114	-.566^{+}	-.111	-.177		
8. Positive Affective Commitment	.067	.114	-.164	-.200	-.060	-.200	-.490	-.203	.074	
9. Miscellaneous	.212	.075	-.136	.103	-.482	-.263	-.114	-.607*	.076	.521

Two-tailed significance: $^{+}$ $p < .10$; * $p < .05$

Table 2.5: Stakeholder Groups and Differences in the Dimensions of Newness

	Stakeholder Groups			
	Customer (n = 3)	Employee (n = 3)	Distributor (n = 2)	Banker (n = 3)
Dimensions of liability of newness	61%	45%	45%	86%
Lack of Reliability	**.116**	.000	.087	.000
Lack of Accountability	**.100**	**.171**	**.129**	**.308**
Lack of Cognitive Legitimacy	.080	.068	**.238**	.021
Lack of Pragmatic Legitimacy	**.131**	**.185**	**.263**	**.142**
Lack of Moral Legitimacy	.083	.008	**.137**	**.263**
Lack of Affective Commitment	**.100**	.018	.007	.021
Dimensions of asset of newness	23%	27%	27%	1%
Positive Pragmatic Legitimacy	**.193**	.057	.007	.000
Positive Affective Commitment	.032	**.214**	.000	.000

[5] There is a marginally significant correlation between lack of pragmatic legitimacy and positive pragmatic legitimacy (correlation coefficient =-.56, $p < .10$). This marginally significant association between positive and negative pragmatic legitimacies was expected - - they could be considered opposite ends of the same dimension.

2.4.2.2 Stakeholder Groups and Dimensions of Newness

Table 2.5 describes how the various stakeholder groups differed in their assessments of a new venture's disadvantages and/or advantages. The customers in this sample mostly focused on (positive) pragmatic legitimacy and reliability - - accountability and cognitive and moral legitimacy were of less concern to them. On the other hand, potential employees most frequently mentioned lack of pragmatic legitimacy and accountability, although they did appreciate the challenges and the innovativeness of a new venture (i.e., they exhibited positive affective commitment). Distributors were concerned about accountability, all three dimensions of legitimacy (cognitive, pragmatic, and moral), and reliability. For bankers, the salient concerns were accountability and moral legitimacy.

Table 2.6: Decision Contents and Differences in the Dimensions of Newness

	Stakeholders' Decision Contents		
	Reject (n = 7)	Conditional (n = 2)	Accept (n = 2)
Dimensions of liability of newness			
Lack of reliability	.074	.000	.000
Lack of accountability	.168	.378	.033
Lack of cognitive legitimacy	.114	.000	.091
Lack of pragmatic legitimacy	.227	.108	.049
Lack of moral legitimacy	.151	.086	.053
Lack of affective commitment	.057	.015	.000
Sum of the liabilities	.791	.588	.224
Dimensions of asset of newness			
Positive pragmatic legitimacy	.013	.015	.322
Positive affective commitment	.017	.106	.204
Sum of the assets	.029	.121	.526

2.4.2.3 Decision Contents and Dimensions of Newness

As shown in Table 2.6, the difference in the aggregate sums for the liability and asset of newness among stakeholders seems to indicate that stakeholders rejecting the offer perceived a greater degree of liability of newness and less asset of newness than did stakeholders accepting the offer. When the liability and asset of newness were investigated separately, the results may indicate that stakeholders' decisions were little influenced by the dimensions of the liability of newness, but were greatly influenced by the dimensions of the assets of newness. Particularly, three dimensions - - lack of pragmatic legitimacy, positive pragmatic legitimacy, and positive affective commitment - - seem important to explain a substantial portion of the difference in stakeholders' decisions. Stakeholders who accepted involvement with the new venture placed less importance on a lack of pragmatic legitimacy and greater importance on the assets of newness - - positive pragmatic legitimacy and positive affective commitment. Stakeholders who rejected involvement with the new venture or who made a conditional decision placed greater importance on the liabilities of newness and lower importance on the assets of newness.

2.5 SUMMARY OF RESULTS

Through proposition development and an exploratory examination of these propositions using verbal protocol analysis, this Chapter revealed how stakeholders perceive new ventures in terms of four dimensions of the liability of newness. The results indicate that stakeholders in this research perceive the liability of newness of a new venture through the suggested four dimensions of the liability of newness - - reliability, accountability, legitimacy, and commitment. Different stakeholders perceive

the liability of newness differently. Specifically, the customers mostly focused on reliability; the potential employees frequently mentioned (pragmatic) legitimacy and accountability; the distributors are mostly concerned about reliability, accountability, and legitimacy; while the bankers mostly focused on accountability and (moral) legitimacy. In addition to the liability aspects, the newness of new ventures involves some asset. Stakeholders, particularly customers and potential employees, seem to perceive positive pragmatic legitimacy and affective commitment from newness.

The liability and asset of newness seem to influence stakeholders' decision on the involvement with the new venture. The stakeholders who reject the offer from a new venture would perceive more liability from the new venture's newness than do other stakeholders who accept the offer from a new venture. With regard to the assets of newness, the more the asset of newness stakeholders would perceive, the greater the likelihood stakeholders would accept the offer from the new venture. The perspective of stakeholders who possess resources is critical to the survival of the new venture. In this Chapter, stakeholders' perception of the liability and the asset of newness appears to influence their decision on the involvement with the new venture (e.g., employment, purchasing, distribution contract, and loan). Therefore, the dimensions of the liability of newness examined with key stakeholders well represent the notion of the mortality risk of a new venture. Implications of this research to scholars and practitioners are discussed in Chapter 5.

CHAPTER 3: ENTREPRENEURS' EXPLOITATION OF A NEW OPPORTUNITY – AN ANALYTICAL APPROACH

Overview of Chapter 3

In Chapter 2, dimensions of the liability of newness were proposed and examined from a stakeholder perspective. The findings from Chapter 2 suggest that stakeholders consider a venture's newness in their decision of involvement with the new venture. It is likely that entrepreneurs consider these liabilities of newness when making important decisions such as shifting from exploring the new opportunity to exploiting it in the entrepreneurial process. As defined in Chapter 1, *exploration* in the entrepreneurial process refers to activities and/or investments for reducing technological and market uncertainties involved in the new opportunity; *exploitation* refers to activities and/or investments committed to gain returns by building efficient business operational systems.

Particularly, in the context where exploration activities of new ventures are not able to accrue first mover advantages, the entrepreneurs' exploitation decision is crucial to gain entrepreneurial rents (Rumelt, 1987). Entrepreneurs, on the other hand, can reduce the new venture's mortality risk by further exploring the opportunity and thereby reducing its liabilities of newness (Stinchcombe, 1965). Therefore, there exists a trade-off for an entrepreneur in deciding when to shift from exploring a new opportunity to exploiting it. In this decision dilemma, it is unclear when it is optimal for an entrepreneur to make the decision to begin exploitation of the opportunity.

This Chapter proceeds as follows: First I review the entrepreneurship and strategic management literatures directed at the entrepreneurial process, profitability, and the mortality risk of new ventures. Second, this review sets up our general model and

characterizes an optimal decision rule. Third, I translate the model's theoretical insights into propositions and offer explanations for each. Finally, I summarize the results of this Chapter. Implications from this framework for scholars and practitioners are discussed in Chapter 5.

3.1 INTRODUCTION

Successful entrepreneurs are those who know when to shift from exploration to exploitation (see March, 1991). For example, Boo.com, a UK-based online fashion retailer, incurred large losses from what appears to have been a hasty decision to pursue full-scale operations. Value America, one of the pioneers of online retailing, also appears to have begun full-scale operations on the basis of an incomplete business model.

Baumol (1993) suggests that the timing of a major innovation involves a trade-off; by rushing a novel item to market an innovator can realize benefits earlier, but by delaying, the innovator can benefit from further development and reductions in production costs. I argue that there exists a similar trade-off for an entrepreneur in deciding when to shift from exploring a new opportunity to exploiting it. Entrepreneurs can increase profit potential by capitalizing on first mover advantages, but they also reduce the new venture's mortality risk by further exploring the opportunity and thereby reducing its liabilities of newness (Stinchcombe, 1965).

When is the optimal time for an entrepreneur to shift from exploration to exploitation? To investigate this question I construct an analytical optimization model, following Baumol (1993), who argues for the appropriateness of an optimization technique to investigate the exploration-exploitation decision. In our model, entrepreneurs of independent start-ups are in an exploration period and face two choices:

continue exploring or stop and begin exploiting. That is, our time horizon ends when the entrepreneur begins exploitation. Our model applies to entrepreneurs who are strongly attached to their new opportunities, and therefore tend to avoid exit from the venturing process. Instead, when the idea seems unviable, they tend to modify it or move on to a new one (Bird, 1989).

This Chapter extends the entrepreneurship literature in several ways. First, I prescribe optimality in the decision about exploitation timing (c.f., Shane & Venkataraman, 2000). Built on Rumelt's (1987) assertion on the role of uncertainty in entrepreneurial rents, the optimality prescription further specifies how entrepreneurs choose the level of uncertainty at which they maximize overall performance. I propose the notion of an *uncertainty threshold*. Second, I draw on the entry strategy literature and complement it by investigating the trade-off between potential profit and mortality risk. The timing of the shift between stages of the entrepreneurial process has not been emphasized in the literature. This is surprising considering the importance of new venture creation to most economies and the acknowledgement of the importance of entry timing by entrepreneurship and strategy scholars. Third, I characterize the entrepreneurial process as exploration-then-exploitation and identify important structural properties (e.g., knowledge creation and the environment for imitation) of that process influencing the timing decision. Fourth, I introduce a methodology, namely an optimal stopping approach, that suits the needs of the decision maker who must choose the best time to stop an activity by calculating additional potential gains from continuing the activity one more period. Here, the activity to cease is exploration.

3.2 THEORETICAL BACKGROUND, MODEL AND OPTIMAL STRATEGY

Entrepreneurs begin by exploring (experimenting on) a newly "theorized or believed" business opportunity in a highly uncertain environment. During exploration they attempt to reduce the uncertainty surrounding the new opportunity. Once they have accumulated enough information to assess the viability of the opportunity they need to shift from exploring to exploiting. It is at this point that the entrepreneur must make major investments - - in building efficient production systems, training staff, and building relationships with customers. The decision to exploit an opportunity is an important one (Schoonhoven, Eisenhardt, & Lyman, 1990), since it seems to directly affect the overall performance of the new venture.

3.2.1 Uncertainty and Knowledge Creation

A primary "exogenous" uncertainty facing an entrepreneur is whether there will be sufficient demand for the new product/service. There is also "endogenous" uncertainty about whether the new venture's products/services can be produced efficiently, reliably and predictably (Wernerfelt & Karnani, 1987). Let t represent time (i.e., the time since the entrepreneur began exploring the newly theorized opportunity) and U_t the entrepreneur's level of total uncertainty (both endogenous and exogenous) at t. The entrepreneur needs to reduce uncertainty to an acceptable level, one that allows him/her enough confidence to proceed with the investments required to exploit the opportunity. Endogenous uncertainty can be reduced by exploration; exogenous uncertainty will likely decrease during the exploration period because, on average, such uncertainty decreases over time as customer preferences and technological trajectories are revealed (Folta, 1998; McGrath, 1997).

Table 3.1: Summary of Variables and Parameters

	Symbol	Description
State Variables	U_t	Entrepreneur's uncertainty level at t
	V_t	Potential competitors' (and stakeholders) uncertainty level at t
	O_t	New venture performance if he/she exploits the new opportunity at t
	P_t	Overall profit potential if he/she exploits the new opportunity at t
	C_t	Total exploration cost until t
	M_t	Mortality risk (i.e., the probability of failure) if the entrepreneur exploits the new opportunity at t
Random Variable	X_t	Entrepreneur's knowledge creation through exploration activity at t
Parameters	λ	Marginal effect of unit knowledge on uncertainty reduction
	α_1	Irreducible uncertainty for potential competitors' observational learning
	α_2	Difficulty for a competitor to decrease reducible uncertainty
	ϕ	Earning rate when there is no lead time
	ω	Marginal effect of uncertainty gap on profit potential
	c	Exploration cost per unit period
	β	Rate at which mortality risk decreases over time
	π	Marginal effect of mortality risk on an entrepreneur's performance
	μ_t	Expected knowledge creation at t

Let X_t be the amount of knowledge *gained* by the entrepreneur as a result of exploration at t. Because the market and technology are unpredictable early in the entrepreneurial process, the magnitude of the gain in knowledge during each exploration period is likely to be independent of that for previous periods. For example, while uncertainties in customer requirements may be resolved through trial and error (Robert & Meyer, 1991), the entrepreneur may not be able even to estimate *ex ante* how much knowledge can be gained in the next period of exploration (Lippman & Rumelt, 1982). Further, knowledge creation in a given functional area (e.g., technology development) at

time t will not necessarily be highly related to knowledge creation in other functional areas (e.g., marketing fields) at time t+1. Thus, I model X_t's as independent random variables of non-negative mean μ_t.

Moreover, the X_t's decrease stochastically with exploration time, i.e., $P(X_t > K) \geq P(X_{t+1} > K)$ for all K and all t. Consequently, the expected (mean value) gain in knowledge will decrease over time (see Ross, 1983). That is, as the marginal learning effect decreases over time along a typical learning curve, knowledge gain in each period of exploration will decrease over time.

Any gain in knowledge decreases the entrepreneur's level of uncertainty from one period to the next, which at t can be expressed by

$$U_t = U_{t-1} - \lambda X_t = U_0 - \lambda \sum_{n=1}^{t} X_n , \qquad (1)$$

where $\sum_{n=1}^{t} X_n$ indicates the entrepreneur's accumulated amount of knowledge at t. λ is the marginal decrease in uncertainty per unit of knowledge, and it takes on a positive value. U_0 is the initial level of the entrepreneur's uncertainty. When U_0 is large enough, uncertainty is kept non-negative.

3.2.2 Possible Imitation by Competitors

Outsiders who can observe the entrepreneur's trials and outcomes can duplicate his/her knowledge (Herriott, Levinthal, & March, 1985; Mosakowski, 1997). "[C]ompetitors typically gain detailed knowledge about a firm's new products within one year of development, and much of the learning on production processes also gets diffused" (Ghemawat, 1986: 53). Therefore potential competitors can free ride and

shorten their own exploration. However, a number of obstacles limit competitor's ability to learn from observation: noise in the communication channels, inventors' and/or early adopters' unwillingness to dissipate information, and the tacit nature of the knowledge (Abrahamson & Rosenkopf, 1993). Nelson and Winter (1982) argue that the more the target knowledge is idiosyncratic and "impacted", the more difficult and problematic imitation becomes. The difficulty of imitation likely varies from environment to environment, and the entrepreneur may have some knowledge that is not imitable at all. This inimitable knowledge represents an irreducible gap in uncertainty between the entrepreneur and his/her (potential) competitors who do not explore the opportunity for themselves.

I thus model uncertainty perceived by potential competitors, denoted by V_t, as a linear function of the entrepreneur's uncertainty where

$$V_t = \alpha_1 + \alpha_2 U_t. \qquad (2)$$

α_1 (>0) represents an irreducible uncertainty for the competitor, and α_2 (>1) refers to the difficulty of decreasing reducible uncertainty. α_2 is greater than 1 because potential competitors usually are even more uncertain about the opportunity than is the entrepreneur. But the gap in uncertainty between the entrepreneur and the potential competitor decreases over time: the entrepreneur's knowledge creation decreases over time, while the competitor's ability to imitate through observational learning remains constant (from Equation 2).

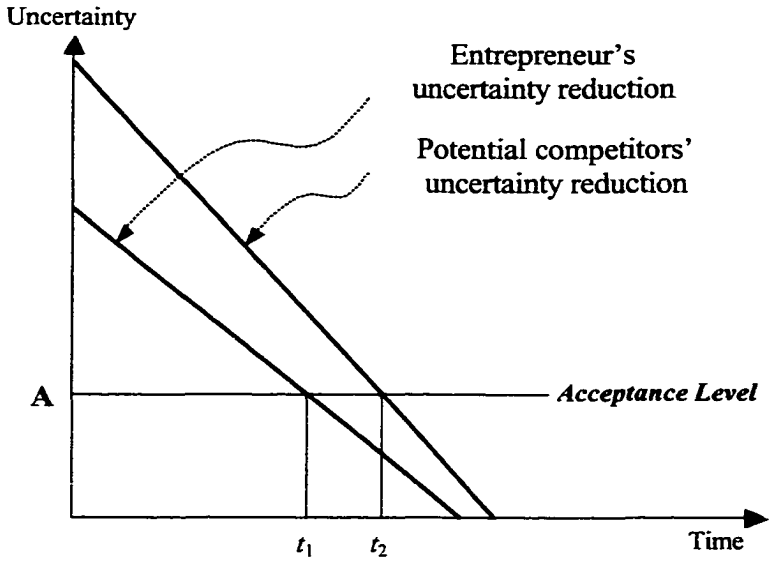
3.2.3 Potential Profitability, Mortality Risk, and Exploration Cost

The entrepreneur should optimize three elements of overall performance: *potential profitability,* which I model as a function of the new venture's lead-time over (potential) competitors; *mortality risk,* a function of time and the uncertainty perceived by potential competitors; and *exploration cost,* a function of time that increases at a constant rate.

3.2.3.1 Potential Profitability

The strategy literature suggests that a new venture should have a long *lead time* (the time during which its market offerings face no, or very limited, direct competition) to develop its first mover advantages and into a sustainable increase in performance (Huff & Robinson, 1994). First mover advantages arise from several sources including technological leadership, learning curve effects, preemption of assets, buyer switching costs, and consumer preference formation (Carpenter & Nakamoto, 1989; Lieberman & Montgomery, 1988). But in order to capitalize on these sources of advantage, the entrepreneur needs to undertake full-scale operations; for example, Lambkin (1988) showed that first movers must disproportionately invest in developing new markets. (There are exceptions, as in the pharmaceutical industry where patent holders are protected from imitation. But in most industries a patent is not a strong defense, because there are multiple technological alternatives that circumvent patent rights [Afuah, 1999]). I suggest that the length of lead time is determined by the size of the gap between the entrepreneur's own uncertainty over the new opportunity and that of his/her potential competitor.

Figure 3.1: Uncertainty and Lead Time



As Figure 3.1 shows, given that the entrepreneur and potential competitors require the same level of certainty, say A, before shifting their focus to exploitation, the entrepreneur will begin exploitation at t_1 and potential competitors will begin exploitation at t_2. The new venture's lead time, (t_2- t_1), will be attributable to the size of the uncertainty gap.

From (2), the uncertainty gap at t is

$$V_t - U_t = \alpha_1 + (\alpha_2 - 1)U_t. \tag{3}$$

On one hand, there is a proportional relationship between the size of the uncertainty gap and the length of the lead time. On the other hand, profit is assumed linear in lead time. Therefore, profit potential at t is linear in uncertainty gap and is expressed by,

$$P_t = \phi + \omega(V_t - U_t) = \phi + \omega\alpha_1 + \omega(\alpha_2 - 1)U_t, \tag{4}$$

where ϕ is the return associated with no lead time and ω is the marginal profit from an increase in the uncertainty gap.

3.2.3.2 Mortality Risk

Mortality risk refers to the probability that a firm will become insolvent and be unable to recover from that insolvency before being bankrupted and ceasing operations (Shepherd, Douglas, & Shanley, 2000). Stinchcombe (1965) introduced the concept of the liability of newness to describe the high mortality risk facing new ventures. The sources of the liability of newness can be categorized as both internal and external to the firm. Internal sources include the costs of learning new tasks, conflicts regarding new organizational roles, and the absence of informal organizational structures (Singh, Tucker, & House, 1986; Stinchcombe, 1965). Choi and Shanley (2000) argue that these internal sources of the liability of newness can be reduced as exploration is extended. Therefore, I posit that the longer the exploration period, the lower the mortality risk at exploitation. I use an exponential functional form to express mathematically the decline over time in the mortality risk of a new venture during exploitation; this functional form is consistent with learning curve studies (e.g., Yelle, 1979). Specifically, mortality risk is a probability and thus ranges from 1 to 0 (Levinthal, 1991; Singh, Tucker, & House, 1986).

An external source contributing to the liability of newness is the lack of stable links with key stakeholders (Singh et al., 1986), which new ventures have difficulty in establishing, in part because of their high levels of uncertainty. High levels of stakeholder uncertainty over the new venture hurt the entrepreneur's ability to garner additional financial resources and attract key employees and customers. The level of

uncertainty perceived by stakeholders is captured by a shifting up or down of the basic mortality risk curve. I use competitor uncertainty as a proxy for stakeholder uncertainty because potential competitors are generally the most interested in obtaining information about the entrepreneur's activities and hence build up knowledge about the new opportunity. This phenomenon can be mathematically represented by

$$M_t = V_t e^{-\beta t}, \tag{5}$$

where β is the rate at which mortality risk declines over time.[6] When a stream of competitor uncertainty $\{V_m\}_{m=1,2,...}$ lies beneath another stream $\{V_n\}_{n=1,2,...}$, the mortality risk curve associated with the former stream lies below that for the latter stream.

Exploration cost

Exploration cost, denoted by C_t, is an important factor in deciding whether or not the entrepreneur should continue exploration. If this cost is too high and the benefits from delaying exploitation (such as a decrease in mortality risk) are trivial, then the entrepreneur would be better off exploiting the opportunity. In a model of adaptive organizational search, Levinthal and March (1981) proposed that the search cost for innovation in each period depends on both a (changing) propensity to search and resources available for innovation. I assume that an entrepreneur's propensity to search is maintained and resources are available throughout the period of exploration. Thus, there is a constant exploration cost, c, per period where

$$C_t = ct. \tag{6}$$

[6] To insure that mortality risk (5) is a probability, the performance function in (7) will be scaled to take into consideration both the marginal effect of mortality risk on performance and the scaling of mortality risk between 0 and 1.

3.2.4 Entrepreneur's Objective

Schoemaker and Amit (1994) indicate that firms' strategic actions constitute a trade-off between maximizing expected returns for stockholders and maximizing survival chances. Radner and Shepp's (1996) analytical model proposes that corporate strategy should aim at maximizing a *linear combination* of profit (the expected total dividends paid out during the life of the firm, discounted at some fixed rate) and bankruptcy (when the firm's cash reserve falls to zero and it therefore ceases to operate). Following their lead I model the performance of new ventures as a linear combination of *profit potential* (the expected total return to investors during the life of the firm, discounted at some fixed rate), *mortality risk* (the probability that a firm will become insolvent and be unable to recover from that insolvency before being bankrupted and ceasing operations), and exploration costs.

I therefore suggest that the entrepreneur's objective is to maximize performance, denoted by O_t, which is a linear combination of potential profit, mortality risk, and exploration cost, i.e., from (4), (5) and (6),

$$O_t = \{\phi + \omega(V_t - U_t)\} - \pi V_t e^{-\beta t} - ct, \tag{7}$$

where $\pi$is the marginal effect of mortality risk on the entrepreneur's performance. I next use expected performances to derive an optimal decision rule on when one should stop exploring and begin exploiting a new business opportunity.

3.2.5 Optimal Exploration/Exploitation Strategy

By applying a classic optimal stopping approach to an entrepreneur's exploitation decision, I argue that if the performance from searching one more period is smaller than

that from exploiting the new business opportunity now, the entrepreneur should exploit now. I demonstrate in Appendix B that this is equivalent to showing that there exists a stopping time N^* where

$$U_{t-1} \geq \frac{1}{\pi \alpha_2 e^{-\beta t}(e^{\beta}-1)}\left\{c + \omega\lambda(\alpha_2 - 1)\mu_t - \pi\alpha_1 e^{-\beta t}(e^{\beta}-1) - \pi\lambda\alpha_2\mu_t e^{-\beta t}\right\} \text{ when } t \leq N^*$$
$$\leq \frac{1}{\pi \alpha_2 e^{-\beta t}(e^{\beta}-1)}\left\{c + \omega\lambda(\alpha_2 - 1)\mu_t - \pi\alpha_1 e^{-\beta t}(e^{\beta}-1) - \pi\lambda\alpha_2\mu_t e^{-\beta t}\right\} \text{ when } t > N^*. \quad (8)$$

Proposition 3.1 (Optimal stopping rule): *The optimal time to exploit a new opportunity occurs when the entrepreneur's uncertainty level reaches a specific threshold. This threshold (given by the right-hand side of Condition* 8*) corresponds to the net expected performance of additional exploration activity, which is weighted by the marginal performance of mortality risk reduction.*

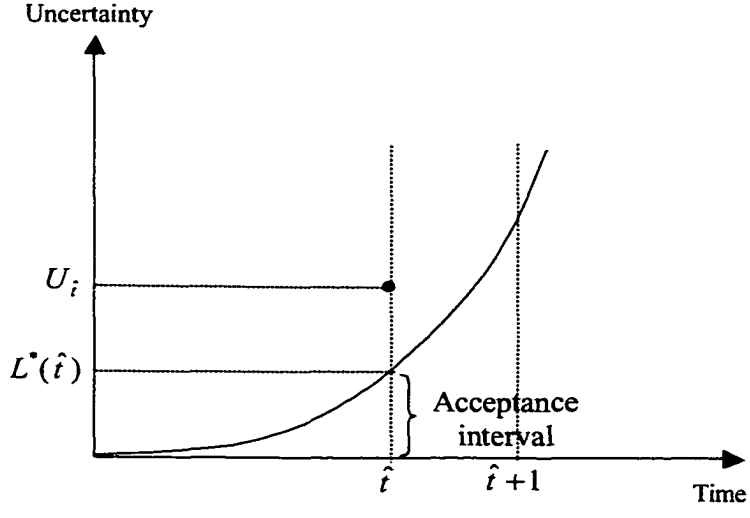
The left-hand side of (8) is the entrepreneur's uncertainty level at t-1, which is expected to decrease over time. The denominator of the right-hand side of (8) indicates the marginal performance from mortality risk reduction. The numerator of the right-hand side of (8) is a linear combination of (i) per period exploration cost, (ii) lost profit from decreased reducible uncertainty, (iii) mortality risk reduction from decreased irreducible uncertainty (due to changes over time in the basic mortality risk function, $e^{-\beta}$), and (iv) mortality risk reduction from decreased reducible uncertainty (due to changes in knowledge creation). Said differently, the entrepreneur maximizes expected performance by delaying exploitation just as long as the expected gain in performance due to a reduction in mortality risk becomes less than or equal to the sum of the expected loss in

performance from exploration cost and lowered profitability. For later use, I denote the right-hand side of (8) by $L^*(t)$, and refer to it as the *uncertainty threshold*.

3.3 POST OPTIMIZATION ANALYSIS

I next investigate the effects of the model parameters on the decision to shift from exploring to exploiting. To this end I observe the movement of the uncertainty threshold, $L^*(t)$, as a model parameter is increased. Figure 3.2 illustrates the uncertainty threshold as a function of time and demonstrates that, since the entrepreneur's realization of uncertainty at $\hat{t}$ is greater than the maximum threshold ($L^*(\hat{t})$), it is not optimal to exploit the new opportunity during that period.[7]

Figure 3.2: Uncertainty Zone for Exploitation Entrance



[7] One can easily verify that the first and second order derivative of $L^*(t)$ with respect to t are positive. Although time is discrete in our model, we utilize a continuous representation of it in Figure 3.2.

At any given period t, movements of the threshold indicate an increase or decrease in the probability that an entrepreneur should exploit the opportunity earlier. The interval below the threshold - - the acceptance interval in Figure 3.2 - - represents the acceptable entry decision space. As this interval increases, I argue that the probability an entrepreneur should exploit sooner rather than later increases, whereas this probability decreases when the interval decreases. The influence of increases in each key model parameter on the acceptance interval of exploitation is shown in Appendix B.

3.3.1 Parameters Encouraging Early Exploitation

Proposition 3.2: *The probability that the entrepreneur should exploit the new opportunity sooner increases when there is:*

a. an increase in the unit exploration cost (c);

b. an increase in the marginal effect of uncertainty gap (and thus lead time) on profit potential (ω);

c. an increase in the marginal effect of time on morality risk (β).

As the unit exploration cost increases, the entrepreneur will have a greater value in the right-hand side of (8), since exploration cost does not influence the relationship between profit potential and mortality risk. This higher cost to benefit ratio of further exploration should encourage earlier exploitation.

If the venture's lead time over its competitors has an increased marginal effect on profit potential, then the entrepreneur can afford to exploit earlier, as doing so increases

(for any given period) his/her profit potential without affecting either the risk of mortality or per period search cost.

As the marginal effect of time on mortality risk increases, mortality risk declines faster and a decision maker's "acceptable" level of risk is thus obtained earlier. In this situation, there are two alternatives: the decision maker can choose earlier exploitation at the same risk and higher profit potential or s/he can choose to exploit at the same time as if there had been no increase in the parameter, achieving the same profit potential at a lower mortality risk. However, the model suggests the former. That is, the entrepreneur enters earlier because the benefit from lower mortality risk does not cover the loss from higher searching costs and lower profit potential.

3.3.2 Parameters Discouraging Early Exploitation

Proposition 3.3: *The probability that the entrepreneur should exploit the new opportunity later increases when there is:*

a. an increase in the marginal effect of mortality risk on performance (π_θ);

b. an increase in the irreducible uncertainty (α_1).

In the right-hand side of (8), an increase in the marginal effect of mortality risk on performance (π_θ) has a negative impact on the entrepreneur's uncertainty threshold. As this marginal effect increases, I also observe that the entrepreneur should wait for an even lower mortality risk to overcome the greater loss in performance that each unit incurs. While this reduces profit potential, that reduction is outweighed by the reduction in mortality risk. Therefore, the entrepreneur should delay exploitation.

Moreover, as the irreducible uncertainty gap (α_1) between the entrepreneur and his/her competitors increases, the entrepreneur should delay exploitation. The urgency to begin exploitation is significantly diminished, because the irreducible uncertainty is sustainable until the competitors begin exploring for themselves. This allows the entrepreneur time to explore further and further reduce mortality risk.

3.3.3 Parameters Having a Dual Impact on Exploitation Timing

Proposition 3.4: *The probability that the entrepreneur should exploit the new opportunity sooner increases when the uncertainty reduction per unit of knowledge (λ) is*

a. increased and the marginal reduction in profit potential from decreased reducible uncertainty $[\omega(\alpha_2 - 1)]$ *is greater than the marginal gain in performance from decreased mortality risk arising from decreased reducible uncertainty* $[\alpha_2 \pi e^{-\beta t}]$;

b. decreased and $\omega(\alpha_2 - 1)$ *is less than* $\alpha_2 \pi e^{-\beta t}$.

I recall that potential profitability is decreased by a reduction in the uncertainty gap, which in turn is decreased by a reduction in the entrepreneur's uncertainty. This occurs because competitor uncertainty is a (linear) function of the entrepreneur's uncertainty. But it is plausible that imitators (competitors) learn faster than the new venture because second-hand learning is easier than first-hand learning. Furthermore, recall that potential competitors' uncertainty is composed of reducible and irreducible uncertainties. Therefore the impact on the threshold line of a change in uncertainty reduction per unit of knowledge depends on whether the net change between profit

potential reduction and mortality risk reduction - - which is influenced by a change in reducible uncertainty - - is positive or negative. Whenever this net change is negative and the uncertainty reduction per unit of knowledge is increased, the entrepreneur should exploit sooner, because delaying exploitation would lose more from reducing profit potential than it would gain from reducing mortality risk. However, when the net change is positive, an increased uncertainty reduction per unit of knowledge delays exploitation.

Another dual impact on the decision comes from the relationship between potential competitors' observational learning and an adjusted exploration cost.

Proposition 3.5: *The probability that the entrepreneur should exploit the new opportunity sooner increases when the difficulty for a competitor to decrease reducible uncertainty* (α_2) *is*

a. increased and profit potential reduction from the reducible uncertainty $[\omega\lambda\mu_1]$ *is greater than an adjusted exploration cost* $[c - \pi\alpha_1 e^{-\beta}(e^{\beta} - 1)]$;

b. decreased and $\omega\lambda\mu_1$ *is less than* $c - \pi\alpha_1 e^{-\beta}(e^{\beta} - 1)$.

Because time reduces mortality risk, an entrepreneur can reduce the mortality risk attributed to irreducible uncertainty by staying longer in exploration. Therefore, the adjusted exploration cost indicates the net exploration cost left after accounting for the mortality reduction attributed to irreducible uncertainty. But the loss in potential profit (recall that more uncertainty is associated with a longer lead time and therefore more potential profit) may exceed the adjusted exploration cost. In this unfavorable situation, if the difficulty for the competitor to decrease reducible uncertainty increases (larger value for α_2), the loss in potential profit will further

increase. Therefore the entrepreneur should exploit even sooner. On the other hand, if the loss in potential profit is below the adjusted exploration cost, the entrepreneur should delay exploitation and explore further.

3.4 SUMMARY OF RESULTS

Using a classic optimal stopping approach, I develop a number of propositions as follows. In the entrepreneurial process, there might exist an uncertainty threshold that indicates the optimal time to exploit a new opportunity. Model parameters have different influences on the exploitation timing. Specifically, exploration cost, influence of lead time on profit potential, and marginal effect of time on mortality risk are positively related to the exploitation timing. The importance of mortality risk in the performance function, and irreducible uncertainty gap are negatively related to the exploitation timing. Uncertainty reduction per unit of knowledge and reducible uncertainty are both positively and negatively related to the exploitation timing. The direction of their influence is determined by the relative impact of these factors on mortality risk reduction and profitability reduction.

The model of this Chapter characterizes the effects of various environmental/industrial factors (such as the length of a new venture's lead time and the nature of imitation) on the time to begin exploitation. Thus, it suggests that the entrepreneur, in deciding whether to continue exploration, should compare the marginal values of benefit (mortality reduction) and costs (lost return in profitability and exploration cost) for each time period. Our model also prescribes that an entrepreneur should delay exploitation as the irreducible uncertainty gap increases. Implications of this research to scholars and practitioners are discussed in Chapter 5.

CHAPTER 4: ENTREPRENEURS' ASSESSMENT OF NEW OPPORTUNITY EXPLOITATION

Overview of Chapter 4

Chapter 3 provided a prescriptive basis on how to optimize two main conflicting forces (i.e., profit potential and mortality risk) in the exploitation decision of the entrepreneurial process. I now investigate these decisions further and empirically test how entrepreneurs make exploitation decisions. What is largely ignored in the entrepreneurship literature is entrepreneurs' decision policies impacting rent exploitation. The exploitation decision (and its timing) is closely related to both potential profitability and mortality risk (through the liabilities of newness). The main theme in this Chapter, therefore, is to further investigate entrepreneurs' exploitation decision policies in the context of mortality risk (through the liability of newness) and potential profitability (through first mover advantages).

This Chapter proceeds as follows: First, based on the explanation in Chapter 3, I further detail the venturing process using the notions of the honeymoon period, exploration, and exploitation. Second, after developing the theoretical framework, I review the literature on factors possibly influencing an entrepreneur's decision on exploitation and develop research hypotheses. Third, I explain the conjoint research method, sample frame, and analysis method. Finally, I summarize the results of this Chapter. Implications from this research for scholars and practitioners are discussed in Chapter 5.

4.1 INTRODUCTION

Entrepreneurs discover new business opportunities. Discovering and exploring the potential of a new business opportunity, however, is not sufficient to obtain entrepreneurial rents; subsequent exploitation (rather than continued exploration) must be taken (Shane & Venkataraman, 2000). In Chapter 3, exploitation is defined as activities and/or investments committed to gain returns by building efficient business operational systems. Thus, it directly indicates the decision to make the investment for full scale operations generating revenues. The decision of exploitation of an opportunity is an important decision the entrepreneur should make in order to create a successful business (Schoonhoven, Eisenhardt, & Lyman, 1990).

On this important entrepreneurial event, some of the most important (and least addressed) questions concerns why some entrepreneurs invest in exploitation investment (growth) too early, while others are too late? *On what factors, from the experimental perspective of the entrepreneurial process, do entrepreneurs rely on when making decisions on whether to invest in full scale operations?*

4.2 A VIEW ON THE VENTURING PROCESS

An entrepreneurs' value creation begins in an environment of high uncertainty (Block & MacMillan, 1985; Cooper, Gimeno-Gascon, & Woo, 1994).[8] The entrepreneur faces uncertainty on multiple dimensions, including the value of the products or services provided by their ventures, the size of the potential market for these products and

[8] This experimental notion of entrepreneurship is consistent with Venkataraman (1997): entrepreneurship "seeks to understand how opportunities to bring into existence "future" goods and services are discovered, created, and exploited, by whom, and with what consequences" (120).

services, and the operational requirements for realizing the venture's value creation potential. Due to this highly uncertain context, entrepreneurship can be seen as "real" experimentation in which entrepreneurs explore a newly "theorized" opportunity for value creation, such as inefficiencies within existing markets, the emergence of significant changes in society, and inventions and discoveries (Drucker, 1985; Schumpeter, 1934), or un-thought of technological features (Kirzner, 1997). While the entrepreneur is engaging in the exploration of the new opportunity, s/he seeks the chance to exploit this opportunity and realize above average returns. The exploitation of proven certainties through most efficient operations is necessary to gain profits (March, 1991). If successful, the entrepreneur earns *entrepreneurial rents* that are defined as "the difference between a venture's *ex post* value (or payment stream) and the *ex ante* cost (or value) of the resources combined to form the venture"(Rumelt, 1987: 143).[9]

Once the viability of a new venture has been affirmed, one can expect that the new venture will be managed differently. During the honeymoon period of information gathering, the entrepreneur engages in the exploration of possibilities for the venture. After the honeymoon, the focus shifts to the exploitation of the possibilities revealed during the honeymoon.[10]

Since entrepreneurs emphasize the exploration of theorized or perceived new opportunities (rather then their exploitation) during the honeymoon period, they face the costs of experimentation without gaining many of its benefits. However, after the

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[9] Even for unsuccessful exploration and exploitation, by engaging in "real" experimentation, entrepreneurs facilitate learning and the accumulation of valuable knowledge throughout the society (McGrath, 1999).

[10] While the new venture can simultaneously engage in both exploration and exploitation, its relative importance might differ at a point in time during the entrepreneurial process. For example, if a new venture

honeymoon period, entrepreneurs might engage in exploitation of the uncovered opportunities (rather than further exploration), since they have substantial knowledge about the true value of the new opportunities and can justify major investments in building efficient production systems, training staff, and building customer relationships. There may, of course, be opportunities for further exploration, but I assume that investors are going to require returns on their investments at some point and that a new venture will remain risky even after its honeymoon. Therefore, as I argue in Chapter 3, entrepreneurs engage mostly in exploration activities during the honeymoon period, whereas they devote additional investments to exploitation of the opportunities, once a venture continues past its honeymoon. The honeymoon period provides the entrepreneur with the knowledge necessary to motivate such a shift.[11] Based on the nature of honeymoon period (thus exploration and exploitation) discussed above, I focus on factors that entrepreneurs may consider in the exploitation decision.[12]

4.3 ENTREPRENEURS' ASSESSMENTS OF OPPORTUNITY EXPLOITATION (MAIN EFFECTS)

As pointed out in Chapter 1, entrepreneurs work to ensure the long-run survival of their ventures rather than just immediate profit performance (Rothschild, 1947). I suggest that entrepreneurs must simultaneously consider both profitability and mortality risk, as decision makers in companies seem to seek a balance between risk and return in

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invests its resources more on capacity expansion and efficient operations of the product, the new venture is considered to engage in exploitation rather than in exploration.

[11] Because of the coincidence between honeymoon period and exploration, the two terms are interchangeable in this dissertation.

[12] I excluded resource endowment factor from consideration, because previous studies widely examined this aspect (c.f., Brüderl & Schüssler, 1990). Thus, resource endowment is included in conceptual discussion, but excluded in the conjoint design of this research.

their investment and strategic decisions (Lévesque & Shepherd, in press; Radner & Shepp, 1996; Bowman, 1982; Schoemaker & Amit, 1994). Moreover, micro and macro contexts influence managers' decision making (Shapira, 1995). To reflect factors that can influence the two main arguments of the mortality risk and profitability assessments, two contextual factors are included in the research model.

As shown in Figure 4.1, the main effect model of the exploitation decision consists of entrepreneurs' assessments of the liability of newness, profitability, and contexts. Following the conceptualization and exploratory findings in Chapter 2, four dimensions of the liability of newness - - endogenous technological uncertainty (as reliability), managerial capability (as accountability), customer acceptance (as cognitive legitimacy), and supporters' commitment (as commitment) - - are assessed and reflect the mortality risk of the new venture. Following the lead time argument in strategic management literature and analytical modeling in Chapter 3, profitability of the new venture is assessed by the threat of imitation. These two main effects are assessed in an internal context (period of exploration) and an external context (financial market). Each factor of the model is now detailed in turn.

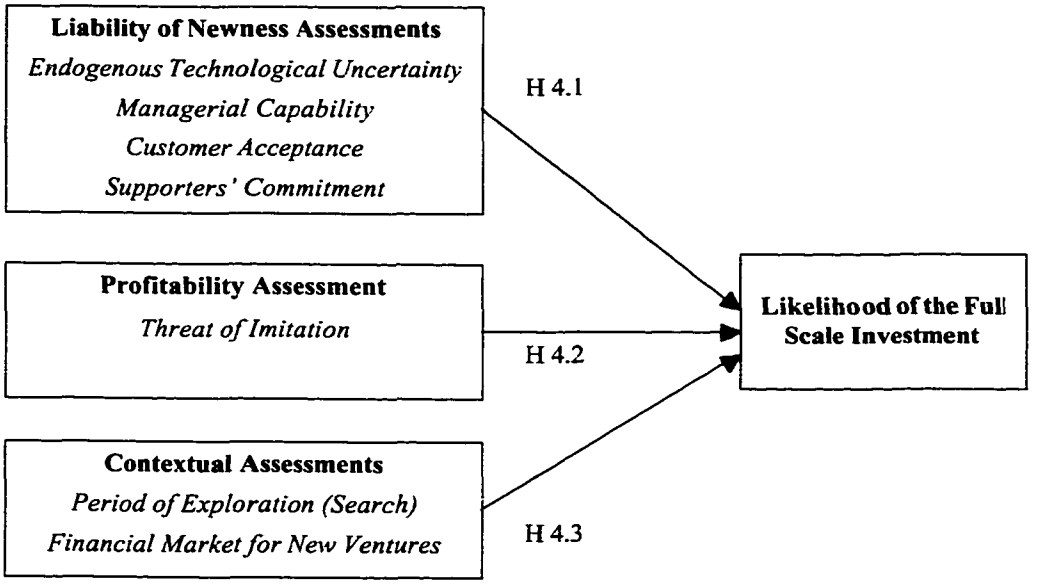
4.3.1 Liability of Newness (Mortality Risk) Assessment

Stinchcombe (1965) introduced the concept of the liability of newness to describe the high mortality risk facing new ventures. Sources of the liability of newness appear to be derived from the costs of learning new tasks; the strength of conflicts regarding new organizational roles; and the presence or absence of informal organizational structures (Stinchcombe, 1965; Singh, Tucker, & House, 1986). Thus, the liability of newness

relates to the actions and learning that the management team and employees must undergo before their risk profile resembles that of an established firm.

In Chapter 2, based on the principles of structural inertia in population ecology (Hannan & Freeman, 1984) and institutional and organization theory (Meyer & Zucker, 1989; Suchman, 1995), I extracted four such characteristics that lack in most new ventures: (i) reliability, (ii) accountability, (iii) legitimacy, and (iv) commitment. These dimensions are used to explore the notion of the liability of newness. As a new venture improves each dimension of the liability of newness, one can expect that the mortality risk of the new venture decreases. This is because the increase in reliability and accountability of the new venture's products and decisions indicates that the new venture becomes an internally efficient and reliable business entity.

Figure 4.1: Factors Influencing an Entrepreneur's Exploitation Decision (Main Effects)



Moreover, as the new venture spreads knowledge on its activities and products throughout the relevant stakeholders (increase cognitive legitimacy), the new venture may be better able to attract customers and garner resources to sustain the new venture. Commitment of stakeholders also can reduce the mortality risk of a new venture in crisis, since committed stakeholders more likely sustain their relationship and provide resources.

Therefore, the degree of the liability of newness of a new venture at a point in time will influence the entrepreneur's decision on the immediate exploitation of the new opportunity, which involves a substantial irreversible investment for full scale operations.

4.3.1.1 Reliability and Endogenous Technological Uncertainty.

As defined and revealed in Chapter 2, reliability is a firm's capacity to repeatedly produce a number of products at a given quality with low variance in the quality of performance (Hannan & Carroll, 1995; Hannan & Freeman, 1984). Reliability is an important attribute for any business, and "given uncertainty about the future, potential members, investors, and clients might value reliability more than efficiency" (Hannan & Carroll, 1995: 20).

In this Chapter, I emphasize endogenous technological uncertainty as a main obstacle of reliability of the products and services provided by new ventures. *Endogenous technological uncertainty* can be reduced by what entrepreneurs do in the entrepreneurial process. For example, Dixit and Pindyck (1994) referred to technical uncertainty to indicate the likely costs and probabilities of accomplishing technical success. Internal operations of the firm in terms of the best process technology also form endogenous uncertainties (Wernerfelt & Karnani, 1987). Therefore, endogenous

technological uncertainty affects new ventures' ability to produce products and services reliably.

New ventures pursuing new opportunities seem to have higher levels of technological uncertainty than their established counterparts. Shepherd, Douglas, and Shanley (2000) suggest that new ventures are faced with novelty in production - - the difficulty of manufacturing the new product such as high cost of retooling, operator training, prototype development, and durability testing. Although not all new ventures face the same degree of endogenous technological uncertainty, new ventures with high innovativeness face high technological uncertainty that hampers their reliability.

In new product development research, scholars suggest that the uncertain quality of the product causes the risk of failure for the product release. Reducing the uncertainty embedded in the new product is necessary: "the new common sense is that it is better to take risks when less is at stake, and it is better to iteratively evaluate and refine ideas so that the best possible strategy is obtained before national introduction (Urban & Hauser, 1980: 59)." Similarly, Meyer and Utterback (1995) suggest that the "development of novel technologies for unfamiliar markets and latent markets requires a great degree of experimentation and learning to reduce uncertainty (298)." Since exploration activities and experimental learning will best reduce endogenous technological uncertainty (McGrath, 1997; Folta, 1998), entrepreneurs are likely to delay exploitation in the presence of endogenous technological uncertainty. Thus,

> **Hypothesis 4.1a**: *The endogenous technological uncertainty of the new opportunity is negatively related to the likelihood of exploitation in the entrepreneurial process.*

4.3.1.2 Accountability and Managerial Capability

Accountability, as defined and revealed in Chapter 2, is the firm's ability to document how resources have been used and to reconstruct the sequences of organizational decisions, rules, and actions that produced particular outcomes (Hannan & Carroll, 1995; Hannan & Freeman, 1984). Hannan and Carroll (1995) insist that people favor procedural rationality and that formal organizations excel at rendering procedurally rational accounts. Established organizations have more structural inertia than do new ventures. Structural inertia provides accountability through processes of institutionalization and by creating highly standardized routines (Hannan & Carroll, 1995; Hannan & Freeman, 1984). Organizational routines refer to a range of organizational-specific skills such as knowledge of specialized rules and tacit understandings that can be evoked repeatedly by members and subunits (Nelson & Winter, 1982). Because of the similarity between accountability and routine, I use them interchangeable in this thesis. Moreover, I focus attention particularly on managerial capability as an essential part of accountability and organizational routine. Managerial capability can be defined as *skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production.*

New ventures have lower levels of accountability than their more established counterparts. It takes time to establish and learn organization-specific skills and routines (Nelson & Winter, 1982). It is harder to create new routines than continue existing ones, because initially there is much learning by doing and comparison among alternatives (Nelson & Winter, 1982). New ventures must hire high-caliber employees, establish social relations among strangers, develop roles and routines, and overcome management

problems (Aldrich & Auster, 1986; Shepherd, Douglas, & Shanley, 2000; Singh et al., 1986; Stinchcombe, 1965). Similar to the notion of lack of accountability and managerial capability, Shepherd, Douglas and Shanley (2000) insist that new ventures also face novelty to management, i.e., the entrepreneurial team lacks general business skills, industry specific information and start-up experience.

The honeymoon (or exploration period) provides a "safe" period for the new organization to more easily create managerial capability and routines. A long honeymoon period seems to facilitate the accumulation of knowledge: "Organizations store knowledge in their procedures, norms, rules, and forms. They accumulate such knowledge over time, learning from their members. At the same time, individuals in an organization are socialized to organizational beliefs (mutual learning)" (March, 1991: 73). If new ventures and stakeholders proceed to build their relationship without substantial learning and without the capabilities of organizational reliability and accountability, the new venture will face higher organizational uncertainty and an increased likelihood of conflicts with its stakeholders, which leads to higher mortality risk. Managerial capability or organizational routines as main elements of accountability are necessary for successful executing full scale operations, which involve more complex and coordinated tasks and decisions. Thus,

Hypothesis 4.1b: *The managerial capability of the new venture team is positively related to the likelihood of exploitation in the entrepreneurial process.*

4.3.1.3 Legitimacy and Customer Acceptance

Organizational theorists consider legitimacy as an intangible asset that determines the ability of organizations to garner capital and personnel (Rao, 1994). Since new

ventures lack historical performance and a track record (Rao, 1994; Starr & MacMillan, 1990), legitimacy is a critical issue facing entrepreneurs (Hunt & Aldrich, 1996). Organizational legitimacy consists of cognitive, pragmatic, and moral legitimacy (Suchman, 1995).

In this Chapter, I focus on the role of cognitive legitimacy on the entrepreneur's exploitation decision. Cognitive legitimacy is defined as *widespread knowledge and understanding of the new venture's activity* (Suchman, 1995). It reduces stakeholders' risk perception of new activities and thus supports venture survival. For example, Rao (1994) insisted that winning organizations in contests achieve "cognitive validity in the eyes of risk-averse consumers and financiers" (32). Similarly, Deeds, Mang, and Frandsen (1997) found that new ventures in the biotechnology industry that displayed high cognitive legitimacy (e.g., frequent appearances in business and industry press) obtained more capital in their initial public offerings (IPOs).

Numerous and positive contacts between a new venture and its customers over an extended period will also likely improve cognitive legitimacy. For example, individual organizations can foster 'comprehensibility' and 'taken-for-grantedness' merely by persisting in their operations (Suchman, 1995). Hannan and Freeman (1984) claim that nothing legitimates both individual organizations and forms more than longevity. Obtaining this legitimacy takes time. Therefore I argue that a longer honeymoon provides a new venture more time to build cognitive legitimacy with its key stakeholders such as customers.

One can assess cognitive legitimacy by measuring the level of public knowledge about a new activity. The highest form of cognitive legitimacy is achieved when a new

product, process, or service becomes taken for granted. In general, new products, organizations, and industries tend to show low cognitive legitimacy. Without cognitive legitimacy, entrepreneurs may have difficulty gaining and maintaining the support of key constituencies (Aldrich & Fiol, 1994), because a lack of knowledge increases uncertainty about decisions, and people are typically uncertainty averse (Kahneman & Tversky, 1979). Entrepreneurs may not be able to rationalize an attempt to commence full scale operations in the situation of low cognitive legitimacy. Thus,

> **Hypothesis 4.1c**: *The customers' perceived cognitive legitimacy for the entrepreneur's products or services is positively related to the likelihood of exploitation in the entrepreneurial process.*

4.3.1.4 Supporters' Commitment

The principles of structural inertia (Hannan & Freeman, 1984) and "permanently failing organizations" (Meyer & Zucker, 1989) implicitly suggest that strong and somewhat irrational commitment of stakeholders is one of the main reasons why poorly performing organizations are "propped up" rather than being closed. Commitment represents an essential ingredient for successful long-term relationships (Gundlach, Achrol, & Mentzer, 1995). Of particular interest is instrumental commitment, which refers to *"the individual's calculative or instrumental assessment of the perceived utility of remaining with the organization or occupation, relative to leaving"* (Wallace, 1997: 735).

I propose that the commitment of stakeholders to the new venture is necessary in executing large stakes of investment. Exploitation of an entrepreneurial opportunity requires that new venture participants invest their resources (such as money, time, and

skills) on new venture specific-areas, which results in less reversible investment. Thus, for the successful implementation of exploitation, entrepreneurs may need evidence of stakeholders' commitment. In strategic management, successful implementation of strategy requires more than a leader - - it requires teamwork from a leadership group through dialogue and collaboration (Hambrick, 1995; Eisenhardt, Kahwajy, & Bourgeois, 1999). In marketing strategy implementation, Noble and Mokwa (1999) revealed that organizational commitment (the extent to which a person identifies with and works toward organization-related goals and values [c.f., Michaels et al., 1988]) and strategy commitment (the extent to which a manager comprehends and supports the goals and objectives of a marketing strategy) influence the overall success of the implementation effort. Since the exploitation decision of the new opportunity is an important strategic change in the course of business activities, its successful implementation would need supporters' commitment. Thus,

Hypothesis 4.1d: *The commitment of supporters that entrepreneurs achieve is positively related to the likelihood of exploitation in the entrepreneurial process.*

4.3.2 Threat of Imitation (Profitability) Assessment

In strategic management, profitability of a pioneer has been explained primarily with first mover advantages. The common wisdom on the relationship between timing of entry and performance suggests that earlier entrants obtain a profitability advantage over and above later entrants. The first mover advantages arise from several sources: technological leadership, preemption of assets, buyer switching costs, and consumer preference formation (Lieberman & Montgomery, 1988; Carpenter & Nakamoto, 1989). I argue that those sources of first mover advantages require large investment and full

scale operations. The mechanisms behind the sources of first mover advantages, which include learning curve effects, preemption of natural resources and product characteristics space, may be difficult to obtain without economies of scale. Lambkin (1988) showed that the first movers have to make the disproportionate level of investment in developing new markets. Therefore, as argued in Chapter 3, *new ventures that are in the period of exploration are not able to build those sources of first mover advantages*. To obtain first mover advantages so that they can attain a high profitability in the long run, the new ventures in the phase of exploration need to shift their focus to exploitation with large investments and full scale operations.

Besides large investment and full scale operations, another ingredient for building first mover advantages is lead time. Lead time is defined as *the length of time the pioneer has a temporary monopoly* (Huff & Robinson, 1994; Shepherd, 1999). Particularly, the benefit of lead time is greatest at the volume production stage (Datar et al., 1997), which is equivalent to the notion of exploitation in this Chapter. The literature suggests that the pioneer should have a long lead time with no or few competitors so that the pioneer can occupy the most profitable niches and build its proprietary position in the market (Huff & Robinson, 1994; Lieberman & Montgomery, 1988, 1998). The entrepreneur needs to secure sufficient lead time to erect entry and/or mobility barriers in order to improve new venture performance. In other words, I expect that the entrepreneur's exploitation decision may partly rely on potential competitors' ability to imitate the new venture thereby threatening to bring to an end the new venture's lead time.

A threat of imitation threatens an end to the entrepreneur's lead time. In this unfavorable situation, it is unclear whether or not entrepreneurs quickly go for

exploitation, a strategic commitment with irreversibility. Since there likely exists a threshold in lead time - - a time period in which if a competitor catches up, no market share gain is achieved by the firm that introduces the product first (Data et al., 1997), entrepreneurs may expect a low chance of obtaining a longer lead time in the situation where imitation threat is high. On the other hand, in the situation where imitation threat is low, they may expect a high chance of obtaining a longer lead time. Thus,

Hypothesis 4.2: *The threat of imitation from potential competitors is negatively related to the likelihood of exploitation in the entrepreneurial process.*

4.3.3 Contextual Assessments

Since decision makers are influenced by micro and macro contexts related to a decision making task (Shapira, 1995), the argument of the two main effects of the liability of newness and the threat of imitation should be assessed in conjunction with appropriate contextual factors. Drawing on the entrepreneurship literature, I consider that the period of exploration (as an internal context) and financial market (as an external context) will well describe the context of the exploitation decision. Each contextual factor is now detailed in turn.

4.3.3.1 Previous Search Period Effect

Gersick (1994) suggested that in project groups and new ventures people set a specific time point where they evaluate progress to date and change their course of actions if progress differs from expectation - - they behave following milestones. This is referred to as temporal pacing of strategic change. Since exploitation is an inevitable step to obtain economic returns through increasing revenues and seemingly the next step of exploration in a new venture development, entrepreneurs likely plan milestones for the

transition from exploration to exploitation. Favorable situations created by low technological uncertainty and customer acceptance might influence the exploitation decision. In addition to this effect, the presence of a milestone for exploitation will add impetus for the decision. Therefore, given the concept of temporal pacing, the period of exploration will affect an entrepreneur's exploitation decision.

The period of exploration provides another implication to decision analysis. That is, time spent in the current new venture would work as a source of decision bias. This may be caused by psychological framing process - - a person may frame his or her current decision relative to a prior loss (Kahneman & Tversky, 1979; Whyte, 1986). This argument predicts that as time spent on the new venture increases entrepreneurs are subject to an escalation of commitment. Although pacing strategic change and escalation commitment rely on different arguments, the two perspectives provide the same prediction on the entrepreneurs' exploitation decision. Thus,

Hypothesis 4.3a: *The period of exploration of the new opportunity is positively related to the likelihood of exploitation in the entrepreneurial process.*

4.3.3.2 Financial Market Attractiveness for New Ventures

Many studies in management depict that entrepreneurs and managers in corporations are responsive to environmental conditions such as munificence and hostility. For example, Romanelli (1989) showed that the availability of resources encourages people to found new firms. The attractiveness of the current financial markets to new ventures has symbolic meaning, indicating the availability of environmental resources for an entrepreneur. This perception seems to affect the new venture's strategic behaviors. Particularly, for example, since an IPO allows a new

venture to access public capital markets to reduce its debt, provide greater liquidity for investors, commit to expansion, and therefore be more attractive to lenders (Thornton, 1999: 29), entrepreneurs in general try to take advantage of the window of opportunity available in financial markets. Moreover, entrepreneurs may note that in such an environment of abundant carrying capacity they can raise financial capital necessary for exploitation at a much lower cost. The IPO of new ventures appears the most preferred exit method for both investors and entrepreneurs (Thornton, 1999). The absence of routes to exit and the absence of liquidity of funds invested in ventures also act to limit upside potential (Birley, 1997).

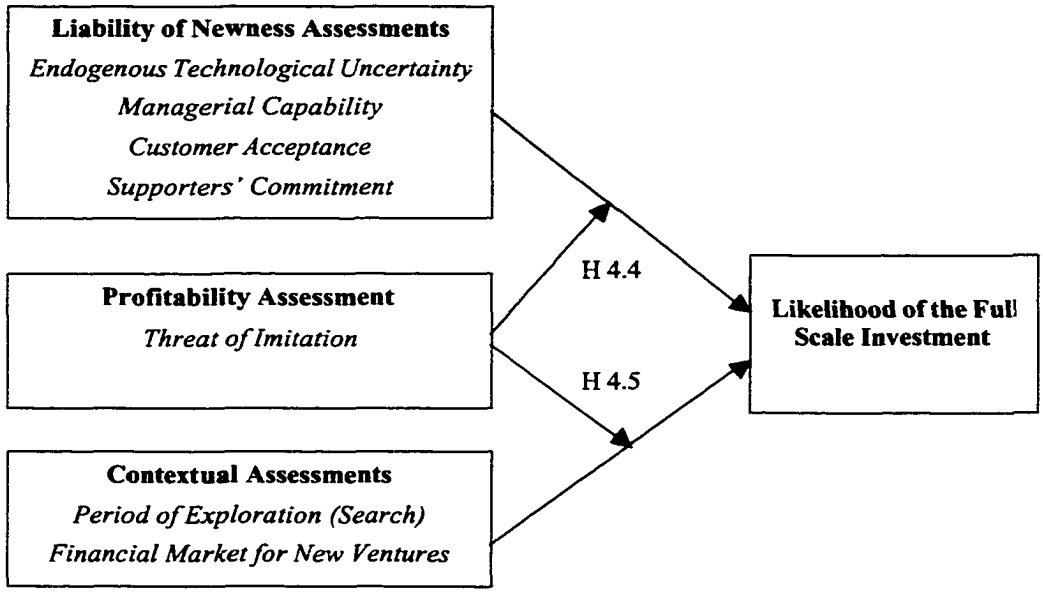
Thus, in the presence of attractive financial markets, where IPO market is booming and abundant venture capital is available, entrepreneurs and investors will be optimistic about the possibility of garnering enough resources necessary for firm growth as well as of finding a successful exit.

Hypothesis 4.3b: *The attractiveness of the financial market for the new venture is positively related to the likelihood of exploitation in the entrepreneurial process.*

4.4 INTERACTION EFFECTS OF THREAT OF IMITATION

The threat of imitation (thus the assessment of potential profitability) is expected to moderate the relationship between the main factors and an entrepreneur's exploitation decision. Since the liability of newness implies both the developmental states of the new venture and the new opportunity, the entrepreneur's perception of the internal strategic positions indicated by the dimensions of the liability of newness will influence their perception of the "real" threat of competition.

Figure 4.2: Interaction Effects in Entrepreneurs' Exploitation Decision



In addition, the general business environment, represented by the financial market attractiveness will influence the entrepreneur's exploitation intention against the threat of imitation. Specific relationships of this argument are detailed below in turn (see Figure 4.2).

4.4.1 Interactions between Liability of Newness and Imitation Threat Factors

Endogenous technological uncertainty indicates the level of technological competence related to the new opportunity. Therefore, with high technological competence, entrepreneurs would always show higher exploitation assessment than with low technological competence, given a level of imitation threat. Furthermore, the influence of technological competence on entrepreneurs' exploitation assessment is greater in low threat of imitation then in high threat of imitation, since the effectiveness

of their technological ability would likely shrink in situations of high threat of competition through imitation. Since early imitators reduce or avoid development and testing costs by reverse engineering (Drucker, 1985), entrepreneurs may consider that the new venture's technological ability acts in a limited way to bring success to exploitation in a situation of a high threat of imitation.

Managerial capability indicates the level of skills, knowledge, and experience of the new venture's management team. With high management capability, entrepreneurs would always show higher exploitation assessment than with low management capability, given a level of imitation threat. Furthermore, the influence of management capability on entrepreneurs' exploitation assessment is greater in low threat of imitation then in high threat of imitation, since high threat of imitation may add additional area (i.e., competition) that the management team of the new venture should deal with for a successful exploitation implementation. Since the new venture should expect to compete against potential competitors in obtaining resources as well as in selling products, the effectiveness of management capability will be limited.

Cognitive legitimacy through customer acceptance of the new venture's new products or services also will likely lead entrepreneurs to show a higher assessment of exploitation in a legitimized situation than in an illegitimate market situation where market demand is uncertain. In the situation where competitive imitation is low, its influence is absolute to determine entrepreneurs' exploitation assessment. However, in the situation where highly competitive actions from imitators are expected, the influence of customer acceptance, even it is influential, is likely reduced. That is, even in the situation where an entrepreneur successfully defines cognitive legitimacy of the product

category and develops customer preference in a way that is favorable to the new venture's product attributes, late movers can identify a superior but overlooked product position within the legitimized product category and/or out-advertise/distribute the first moving new venture (Shankar, Carpenter, & Krishnamurthi, 1998; Urban et al., 1986). Thus, if the entrepreneur perceives a shorter lead time, s/he may be less able to identify the superior product position and erect entry and mobility barriers, which leads to a less successful exploitation.

Supporters' commitment is a necessary component to implement a risky and complex exploitation strategy (Noble & Mokwa, 1999). Thus, supports' commitment is highly requested, which leads entrepreneurs to show higher exploitation assessment when they obtained stakeholders' commitment. However, in a highly competitive market situation, even the influence of supporters' commitment may be limited in bringing exploitation success and profitability. Thus, in that situation, entrepreneurs may rely less on supporters' commitment. Thus,

Hypothesis 4.4a: *Endogenous technological uncertainty is more negatively related to the likelihood of exploitation when the threat of imitation is low than when it is high.*

Hypothesis 4.4b: *Managerial capability is more positively related to the likelihood of exploitation when the threat of imitation is low than when it is high.*

Hypothesis 4.4c: *Customer acceptance is more positively related to the likelihood of exploitation when the threat of imitation is low than when it is high.*

Hypothesis 4.4d: *Supporters' commitment is more positively related to the likelihood of exploitation when the threat of imitation is low than when it is high.*

4.4.2 Interaction between Contextual and Threat of Imitation Factors

The attractiveness of financial markets such as IPO and venture capital will influence entrepreneurs' expectation of obtaining substantial financial returns and financial resources. Thus, it will generally relate to a higher assessment of new opportunity exploitation. This fundamental relationship is likely moderated by the threat of imitation. Even in the situation in which a highly competitive environment due to imitation is expected, the *attractiveness* of financial market encourages entrepreneurs to make the exploitation decision. Entrepreneurs may also perceive that the presence of a high threat of imitation indicates a situation in which a window of opportunity is being closed sooner or later. Thus, if the financial markets are attractive in this situation, entrepreneurs may be subject to the influence of bandwagon effects (Low & Abrahamson, 1997). On the other hand, even in the situation in which competitive imitation threat is minimal, financial market *collapse* much greatly decreases entrepreneurs' positive assessment on the necessity of making full scale operations.

The influence of the period of exploration on exploitation is expected to be moderated by the level of the threat of imitation. In the situation where the threat of imitation is high, entrepreneurs may less rely on heuristic decision rules, which leads them to be less influenced by the period of exploration in the exploitation decision. Thus,

Hypothesis 4.5a: *Financial market attractiveness is more positively related to the likelihood of exploitation when the threat of imitation is high than when it is low.*

Hypothesis 4.5b: *The period of exploration is more positively related to the likelihood of exploitation when the threat of imitation is low than when it is high.*

4.5. RESEARCH DESIGN

4.5.1 Research Method: Overview of Conjoint Analysis

The obstacle that most research focusing on events during the early entrepreneurial process confronts is that data accessibility is limited. Conjoint analysis is used in fields where dependent variables are hard to measure directly. Conjoint analysis is a general term referring to *a technique that requires respondents to make a series of judgments based on a set of attributes (cues) from which the underlying structure of their cognitive system can be investigated* (Shepherd & Zacharakis, 1997).

Conjoint analysis has potential for use in almost any scientific field where measuring people's perceptions or judgments is important (Riquelme & Rickards, 1992). Conjoint analysis and policy capturing have been used in hundreds of studies of judgment and decision making (Stewart, 1988; Green & Sirinivasan, 1990). These studies vary from research into consumer purchase decisions (Lang & Crown, 1993), manager's strategic decisions (Priem, 1994; Hitt & Tyler, 1991) and expert judgment (Davis, 1996). Particularly, Shepherd and Zacharakis (1997) suggest that real time methods such as conjoint analysis can avoid self-selection bias caused by studying only survival firms in strategic management and entrepreneurship.

4.5.2 Operationalization of Variables

In this conjoint experiment, entrepreneurs evaluate a series of conjoint profiles that describe new ventures based on seven attributes (factors), to make assessment of the situation and decide on their course of action.

4.5.2.1 Dependent Variable

The dependent variable is the likelihood of commencing the investment for the full scale operation of the new venture. Entrepreneurs' assessment on the dependent variable is captured by a seven-Likert scale from very unlikely ("1") to very likely ("7"). The full scale operation in this Chapter refers to the scale required for a new venture to ship its first product for revenues (Schoonhoven, Eisenhardt, & Lyman, 1990), not for market testing. Thus, it entails significant irreversibility in terms of product model and facilities. This notion also can be applied to an E-commerce new venture, because it needs substantial investment for full operation in the E-Commerce businesses: $1million to $5 million is required to develop and launch a site that is functionally equivalent to most industry participants (Alexander, 1999).

4.5.2.2 Attributes and Levels of Independent Variables

Attributes (factors) used in conjoint venture profiles work as independent variables explaining variations in entrepreneurs' assessments on the investment for the full scale operation. In developing the conjoint profiles, extensive consultation was held with practicing entrepreneurs and faculty members possessing experience of start-ups to insure that the attributes and levels chosen represent the variation that typically occurs in the decision environment of entrepreneurs in the early venturing process, thereby enriching the overall believability (i.e., face validity) of the task.

Entrepreneurs evaluated a series of conjoint profiles which describe new ventures in terms of seven attributes: (i) Endogenous Technological Uncertainty, (ii) Managerial Capability, (iii) Customer Acceptance, (iv) Supporters' Commitment, (v) Threat of Imitation, (vi) Period of Exploration (Search) and (vii) Financial Market Attractiveness

for New Ventures. These seven factors were manipulated at two levels each, as demonstrated in Table 4.1. Discussions with entrepreneurs and academics confirmed the face validity for both the attributes and their levels detailed in Table 4.1.

4.5.2.3 Control Variables

In this Chapter, several factors related to an entrepreneur's demographic characteristics and entrepreneurial experience are collected using an one page post-hoc questionnaire (see Appendix C for variables included in the questionnaire).

4.5.3 Experimental Design

A fully crossed factorial design involving seven attributes at two levels will require 2^7 (=128) profiles. From the conjoint experiment design, an orthogonal fractional factorial design was used to reduce the number of attribute combinations and thus make the decision making task more manageable (Green & Srinivasan, 1990). Each of the seven attributes was varied at two levels in a fractional factorial design consisting of 16 profiles (Hahn & Shapiro, 1966). The fractional factorial design allows researchers to test each main effect and every two-way interaction between the threat of imitation and the other six factors. Each of the profiles was fully replicated. The total 32 profiles were randomly assigned to avoid order effects, with a further practice profile. The practice profile familiarizes respondents with the task. Once the respondents completed the conjoint task, they provided self explicated weights representing "espoused" factor importance. An initial conjoint experiment design was evaluated by five doctoral and MBA students of entrepreneurship and management at RPI who have set up their own business. After changes, I then piloted the experiment with three local entrepreneurs.

Table 4.1: Operationalization of Independent Variables (Attributes and Levels)

Terms	Levels	Descriptions
Period of Exploration (Search)	**Long**	Since founding the new venture, you have spent ***three years*** exploring and searching for better products, businesses, and technological alternatives arising from this opportunity and have not taken the next step of a full scale investment.
	Short	Since founding the new venture, you have spent ***one year*** exploring and searching for better products, businesses, and technological alternatives arising from this opportunity and have not taken the next step of a full scale investment.
Financial Market for New Ventures	**Attractive**	The current financial market for new ventures (e.g., venture capital and IPO market) is ***highly attractive***.
	Unattractive	The current financial market for new ventures (e.g., venture capital investment and IPO market) is ***highly unattractive***.
Threat of Imitation	**High**	A ***substantial*** amount of information about your business/ technological ideas and methods has been diffused throughout the industry so that (potential) competitors have ***access*** to them.
	Low	***Little*** amount of information about your business/technological ideas and methods has been diffused throughout the industry so that (potential) competitors ***do not*** have access to them.
Technological Uncertainty	**High**	The new venture has ***not yet established*** the technologies necessary to fully grasp the new opportunity.
	Low	The new venture has ***established*** the technologies necessary to fully grasp the new opportunity.
Customer Acceptance	**High**	Customers have ***substantial*** knowledge about the new venture's activities (products & services), and you are ***quite certain*** that there is a substantial future demand.
	Low	Customers have ***little*** knowledge about the new venture's activities (products & services), and you are ***uncertain*** that there is a substantial future demand.
Managerial Capability	**High**	You and your management team have ***considerable*** skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production.
	Low	You and your management team have ***limited*** skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production.
Supporters' Commitment	**High**	Supporters (e.g., management team, investors, and suppliers) are ***highly*** supportive of the new venture.
	Low	Supporters (e.g., management team, investors, and suppliers) are ***marginally*** supportive of the new venture.

Figure 4.3: Sample Profile of the Conjoint Analysis

New Venture DGW

1. Period of Exploration (Search)	**Three** years
2. Financial Market for New Ventures	**Attractive** financial market
3. Threat of Imitation	**High** threat of imitation
4. Technological Uncertainty	**Low** uncertainty
5. Customer Acceptance	**Low** acceptance
6. Managerial Capability	**Low** capability
7. Supporters' Commitment	**High** commitment

Assessment:

Assume that you are the founder of the new venture being described above. As the founder, what would be your assessment today on the likelihood that you would commence the 'full scale' investment in this venture?

Please circle your response on the scale below.

Full scale investment very unlikely						**Full scale investment very likely**
1	**2**	**3**	**4**	**5**	**6**	**7**

4.5.4 Research Instrument

The research instrument contained a cover letter, task instructions, the conjoint decision making task, and a post-hoc questionnaire. The research instrument asks entrepreneurs to answer questions regarding characteristics of themselves and their firm. A copy of the complete research instrument is contained in Appendix C. Relevant term definitions were also included on a detachable sheet that could be referred to while completing the survey. Once instructions were understood, respondents considered each conjoint venture description and provided a rating on a 7 point scale for the dependent

measure (the likelihood of investment for full scale operation). A sample profile is demonstrated below in Figure 4.3.

4.5.5 Sample and Data Collection

4.5.5.1 Population

The population for this research is independent entrepreneurs involved in high-technology ventures, specifically those whose new ventures are located in business incubators in the U.S. Thus, entrepreneurs whose new ventures are located in the National Business Incubator Association's list of members represent the sampling frame for this research.

4.5.5.2 Sample Selection and Data Collection

The entrepreneurs in randomly selected incubators among the NBIA (National Business Incubator Association, 2000) members were randomly contacted by the author. The initial contact media were email and phone. I used the web site of each selected incubator to find independent entrepreneurs who were not affiliated with the parent corporation. For each randomly selected new venture, the entrepreneur of the new venture - - founder, CEO, president, and/or vice president - - were contacted through his/her or company email address. Only one entrepreneur in each new venture was contacted.

Two methods of data collection were used: (1) experiment collected by the author, and (2) experiment sent by mail. Analysis of variance was applied to examine differences in individual characteristics between those responses collected through mail and those collected via interview. For reasons of resource efficiency only those

entrepreneurs located in the capital region of the State of New York were collected by personal visit. For entrepreneurs situated within the capital region of the State of New York, an email was sent requesting assistance with the research. This was followed up by a phone call enlisting support and arranging a time and date for a 30 minute appointment between the author and the entrepreneur. At the appointment, the importance of the research was emphasized and the survey was completed by the interviewee.

Entrepreneurs of the sampling frame not located in the capital region of the State of New York were emailed requesting assistance with the research. This was followed up by a phone call enlisting support and ascertaining the appropriate number of surveys to be sent. Surveys were then sent with a cover letter from the author. A copy of emails and letters are contained in Appendix D. Approximately one week after the surveys were sent, an email or a phone call was made to ensure the surveys were received and to answer any questions. If the completed surveys had not been returned within a further ten days, a final reminder telephone call or email was made. Table 4.2 shows the calculation of response rate.

A paired samples t-test was performed on the reliability of their assessments, and individual characteristics of those responses collected through mail and those collected through interview. The two methods of data collection were not significantly different for either test, consequently the two groups of responses were treated as one.

Table 4.2: Calculation of Response Rate

Descriptions	Numbers (questionnaire)	Numbers (interview)	Total Numbers
Total number of contacts through emails or phone calls	230	37	267
Undelivered (returned) emails or phone calls	26	13	39
Number of declined cases due to time limitation or other reasons	11	6	17
Never responded emails (emailed to company)	143 (80)	0	143 (80)
Effective number of questionnaire mailed out or interviews appointed	50	18	68
Responses received or interviewed	37	18	55
Response Rate	18% (37/204)	75% (18/24)	24%(55/228)

Table 4.3: Descriptive Statistics of the Sample

	N Valid	Missing	Mean	Median	Mode	Std. Deviation	Minimum	Maximum
Individual Characteristics								
Age	55	0	41.44	41	22	13.03	19	75
Gender	55	0	.89	1	1	.31	0	1
Education Level	55	0	3.84	4	4	1.01	1	5
Education Type	55	0	2.35	2	2	1.14	1	5
Years with Current Venture	53	2	4.84	3	1	4.97	0.5	21
Years Employed	53	2	19.80	17	15	12.66	1	55
Years in Business	51	4	16.16	15	3	11.93	1	40
# of Start-up	51	4	2.27	2	1	2.01	1	12
Working Full-time	55	0	41.44	41	22	13.03	19	75
Venture Characteristics								
# of Employee	52	3	12.94	6	5	17.10	0	85
# of Co-Founders	51	4	1.94	2	2	1.03	0	4
Development Stage	52	3	1.87	2	2	.74	1	4
Founding Year	49	6	1997.20	1998	1999	3.34	1983	2001
Industry	52	3	3.15	3	1	1.94	1	6
Sales in 1999($ in Million)	27	28	10.09	0.3	0.1	47.96	0	250
Sales Growth (%)	25	30	94.84	40	0	158.34	0	700

Note: Gender: 0=Female, 1=Male; Education Level: 1=High School, 2=Some College, 3=Bachelor's, 4=Master's, 5=Ph.D.; Education Type: 1=Business, 2=Engineering, 3=Liberal Arts, 4=Science; Working Full-time: 0=Full-time, 1=Part-time; Development Stage: 1=Start-up, 2=Early Growth, 3=Expansion, 4=Maturity, 5=Decline; Industry Type: 1=Computer, 2=Telecommunication, 3=Internet, 4=Bio/Pharmaceutical, 5=Medical Equipment, 6= Engineering (Other).

4.5.6 Sample

4.5.6.1 Individual Characteristics of Decision Makers

Fifty five entrepreneurs representing 55 new ventures completed the survey. The descriptive statistics for the sample is shown in the Table 4.3. Details about the frequencies of these characteristics are contained in Appendix E. The sample of this research well represents wide ranges of technological entrepreneurs in terms of age, business experience, education type, and start-up experience. Participating entrepreneurs range from age 19 to 75, with the average of 41-year-old. Their business experience ranges from one year to 40 years, with the average of 16 years. About 35% of the entrepreneurs have engineering education background and 27% of the entrepreneur have business education background. Start-up experience ranges from one to 12 start-ups, with the average of 2 start-ups. On the other hand, the participating entrepreneurs represent a homogenous group of technological entrepreneurs in terms of gender, education level, and full time commitment. That is, 89% of the participants are male; 67% of them hold a Master's or higher degree; and 80% of the participants are working full-time for their new venture (see both Table 4.3 and Appendix E)

4.5.6.2 Firm Level Characteristics

The characteristics of the new ventures for which the entrepreneurs of this research are working as Founder, CEO, President, and/or Vice President are also presented in the Table 4.3. Based on median statistics, the new ventures of this research can be characterized as follows: the new venture in the sample employs six employees, was founded in 1998 by two co-founders, is in early growth stage of its life cycle, realized .30 million dollar revenue, which represents 40% sales growth rate. Since over

half of the entrepreneurs did not report their sales, the average sales and its growth figures for the sample new ventures are likely overestimated.

4.5.7 Analysis

4.5.7.1 Analysis of Variance

To identify the determinants of entrepreneurs' assessment on the exploitation decision that are statistically significant, an individual-subject analysis of variance (ANOVA) was performed on the decision making of each entrepreneur. Although two or more attributes may significantly affect the decision process, it is unlikely that those attributes will be of equal importance (Ettenson et al., 1992). Therefore, statistical significance at the individual level is supplemented with a measure of relative importance. Hays' (1973) omega squared (ω^2), a measure of explained variance, was used to assess the relative importance of the eight attributes and selected two-way interactions to each respondent's decision.

Within the ANOVA category of statistics, the general factorial model was selected. The dependent variables and independent variables were entered and range defined for independent variables. A custom model was constructed with all main effects and selected interactions. Type III sum of squares and within cells error term were the model options chosen. Means for all main effects and the selected two-way interactions were requested as were omega squared estimates of effect sizes.

4.5.7.2 Regression Analysis

An individual-subject regression analysis was performed on the decision making of each entrepreneur. To identify the factors which are statistically significant in

entrepreneurs' decision making at the aggregate-subject level the t-statistics on the regression coefficients were aggregated to form a Z-statistic (Patell, 1976; Dechow, Huson, & Sloan, 1994) as follows:

$$Z = \frac{1}{\sqrt{N}} \sum_{j=1}^{N} \frac{t_j}{\sqrt{k_j/(k_j-2)}} \Big/ \sqrt{1+(N-1)\bar{r}}$$

where t_j = t-statistic for individual j; k_j = degrees of freedom in regression for individual j; N = number of firms in sample. The Z-statistic is distributed asymptotically as a standard normal variate (Anderson, 1971; Dechow et al., 1994) and computed under the assumption of independence among individuals, that is, r = 0.

Linear regression was the statistical method chosen. The independent and dependent variables were entered. Regression coefficient estimates and model fit measures were requested. The constant was requested and used in the analysis. The low level of each factor was coded 0, while the high level of each factor was coded 1.

4.5.7.3 Reliability

Experimental formats could have been unfamiliar to entrepreneurs and therefore it was important to test consistency of responses for each individual. Sixteen replicated profiles were evaluated with the 16 original and identical cases and were used in a test-retest measure using Pearson R correlations. The order of factors in the original profile was randomly changed in the replicated profile. Discussions with respondents indicated they were unaware that cases had been repeated.

4.5.8 Issues of Validity

Unlike post hoc methodologies, conjoint analysis focuses on concurrent techniques of obtaining and analyzing decision making. However, conjoint analysis frequently faces with questions of external validity. Since conjoint analysis is performed with an experimental design, internal validity issues are relatively minimal.

4.5.8.1 External Validity

External validity concerns whether the findings will be representative and whether the results can be generalized to similar circumstances and subjects (Creswell, 1994). I tried to reduce validity threats by studying entrepreneurs who most likely face or will face the exploitation decision. Brehmer and Brehmer (1988) suggest that experienced judges with representative task conditions face few external validity problems. Hypothetical venture profiles may be subject to lack of external validity (Murphy, Herr, Lockhart, & Maguire, 1986; Strong, 1992). However, according to scholars, paper representations are useful for capturing decision policies of professional decision makers - - professional judgment involves abstract coding of the cues, similar to that in conjoint analysis tasks (Brehmer & Brehmer, 1988; Brehmer, 1988; Phelps & Shanteau, 1978; Riquelme & Rickards, 1992).

Another issue in external validity of conjoint analysis is that conjoint analysis eliminates decision makers' attribute extraction role from the task (Brehmer & Brehmer, 1988). In this research the cues used for the conjoint analysis are theoretically justified by the several bodies of management literatures and discussions with entrepreneurs and academics. Thus the instrument for conjoint analysis of this research has face validity.

With regard to nonsense cases, the instrument was pre-tested with entrepreneurs and graduate business students to find unrealistic cases. All cases were deemed realistic.

4.5.8.2 Internal Validity

Since this conjoint experiment was performed only once and at one point in time (or a very short period of time), there is unlikely any history and maturation effects. Test and instrument effects are also unlikely as the replication was run simultaneously and the entrepreneurs were unaware that profiles were replicated.

It was emphasized that all responses remain anonymous so that minimizes the possibility of alternation in judgment policy. Another concern regarding experimental effects is the possibility of placing importance on the factors, just because they are presented in the experiment. However, Schepanski, Tubbs and Grimlund (1992) show that experienced judges are unlikely to place importance on a cue solely because it has been presented in an experiment. As an effort to minimize this effect, I included, in addition to the main factors, two contextual factors in the experimental profile. Moreover, the post hoc questionnaire measures the importance of the factors. All cues were reported as at least moderately important.

Following the suggestions from Louviere (1988) that higher order interactions account for minuscule proportions of variance, three way or higher interactions were ignored in the conjoint analysis. Regarding sample size and statistical power, smaller sample sizes are acceptable with conjoint analysis as replication allows individual level analysis. Individual assessments can be used to develop an aggregate model. Shepherd and Zacharakis (1997) suggested a sample of at least 50 would be sufficient. Independent variables were manipulated to vary at two levels, which resembles real

situations in the context. Face validity for the independent variables was checked with entrepreneurs and academics.

4.6 RESULTS

This section presents the results of the research using the conjoint methodology. Each hypothesis proposed in this Chapter is tested and the result is presented. In this section, first the significance of the influence of each main factor and interaction on the entrepreneur's exploitation decision (i.e., investment for full scale operations) is revealed. Second, relative importance placed on those factors is analyzed through Omega-Squared (ω^2) statistics. Finally, reliability of entrepreneurs' judgments is established.

4.6.1 Factor Significance at Individual Level of Analysis

The result of ANOVA of each entrepreneur's assessment on his/her likelihood of investment for full scale operations is presented in Table 4.4. Bold-faced and bold-underlined numbers in the table indicate that each factor or interaction had statistically significant effect ($p<.05$ and $p<.10$, respectively) on his/her assessment. The numbers represent the Omega-Squared estimates of effect size.

As shown in Table 4.4, factors related to three types of assessment (i.e., mortality risk, potential profitability, and business context) were significantly considered by the entrepreneurs in their assessment of exploitation investment. The number of significant linear regression models ($p<.05$) (that is, significant test of R^2 with F statistics) is 55 (100%) and the mean adjusted R^2 is .80 (see Table 4.5).

The factors most used by entrepreneurs' in their exploitation decision (i.e., investment for full scale operation) were customer acceptance and managerial capability

in mortality risk assessment, threat of imitation in profitability assessment, and financial market in context assessment. Specifically, customer acceptance was significant ($p<.05$) for 93% of entrepreneurs, followed by managerial capability with 80%, threat of imitation with 71%, supporters' commitment with 67%, financial market attractiveness with 67%, (endogenous) technological uncertainty with 60%, and period of exploration with 29% (see Table 4.4).

Certain types of two way interactions were used frequently. Threat of imitation's interaction with (endogenous) technological uncertainty was significant ($p<.05$) with 24% of entrepreneurs. Threat of imitation's interactions with supporters' commitment and financial market attractiveness were each significant for 18% of entrepreneurs. Threat of imitation's interaction with customer acceptance was significant with 15% of entrepreneurs, and its interactions with managerial capability and period of exploration scope were significant for 13% of entrepreneurs.

4.6.2 Factor Significance at Aggregate Level of Analysis

The Z scores that are derived from the individual t-statistics of linear regression equations are presented in Table 4.5. With the Z scores, one can find statistical significance of each main and interaction effect in the entrepreneurs' likelihood of investment for full scale operations (i.e., at the aggregate level of analysis). As shown in Table 4.5, all main effects were significant in entrepreneurs' assessment of likelihood of full scale investment. The mean regression coefficient for each main effect indicates that period of exploration, financial market attractiveness, customer acceptance, managerial capability, and supporters' commitment were associated with a higher likelihood of commencing full scale operations by entrepreneurs.

Table 4.4: Significance and Relative Importance (ω^2) of Factors and Interactions (ANOVA)

ID	PE	FM	TI	TU	CA	MC	SC	TI*PE	TI*FM	TI*TU	TI*CA	TI*MC	TI*SC	Reliability
1	.007	.000	.007	**.069**	**.350**	**.244**	.000	.007	**.132**	.000	.007	.000	**.015**	**.834**
2	**.112**	**.144**	**.112**	**.180**	**.180**	**.112**	**.112**	.000	.000	.000	.000	.003	.000	**.953**
3	.000	.000	**.087**	**.116**	**.271**	**.087**	**.149**	.000	.010	.010	.010	.000	**.023**	**.724**
4	.000	.003	.000	**.156**	**.421**	**.253**	**.062**	.000	.000	**.009**	.000	**.018**	**.009**	**.941**
5	.001	**.013**	**.013**	**.023**	**.112**	**.165**	**.580**	.006	.000	.001	**.013**	.001	**.006**	**.936**
6	.000	.000	.024	**.116**	**.261**	**.073**	**.073**	.013	.000	.000	.013	.000	.024	**.629**
7	**.025**	**.167**	**.240**	**.107**	**.167**	.012	**.025**	.000	.000	.000	.012	.012	.012	**.834**
8	**.150**	**.119**	**.184**	**.150**	**.221**	**.069**	**.008**	.000	.000	.000	**.018**	.001	.000	**.946**
9	**.365**	**.042**	.000	**.042**	**.028**	**.323**	.001	.000	.007	**.059**	.000	.007	.007	**.867**
10	**.012**	**.404**	.000	.000	**.086**	**.322**	.000	.000	**.012**	.000	.000	.000	.004	**.855**
11	.008	.000	**.016**	.000	**.552**	**.086**	**.052**	.000	**.106**	**.016**	**.026**	.001	.000	**.833**
12	**.023**	**.036**	**.068**	**.023**	**.023**	**.529**	**.036**	.000	.000	.000	.004	.000	.000	**.722**
13	.000	.000	**.176**	.001	**.216**	.031	**.106**	.001	.000	.000	.000	.000	.001	.433
14	.018	**.083**	.000	.018	**.083**	**.128**	.000	**.083**	.018	.018	.000	.000	.000	**.529**
15	.006	**.501**	**.031**	**.021**	**.198**	**.057**	**.031**	.000	.000	.000	.000	**.021**	.006	**.907**
16	.000	.013	**.021**	**.021**	**.853**	**.007**	**.007**	.000	.000	.000	.000	.000	**.021**	**.936**
17	.000	**.112**	**.043**	.000	**.241**	**.460**	**.011**	.000	**.031**	.000	.000	.000	.000	**.897**
18	.008	.000	**.134**	**.398**	.008	**.295**	**.034**	.000	.000	.000	.000	.000	.000	**.893**
19	.004	**.029**	**.209**	.000	**.477**	**.014**	**.072**	**.029**	.004	.000	.014	.000	.000	**.879**
20	.002	**.033**	**.389**	**.164**	**.164**	**.020**	.009	**.020**	.000	.002	.000	.000	.009	**.872**
21	**.065**	**.065**	**.132**	**.132**	**.065**	**.132**	**.132**	**.021**	.000	**.132**	.000	.000	.000	**.878**
22	.000	.000	.000	.000	**.278**	**.527**	.000	.000	**.041**	.000	.000	.000	.000	**.808**
23	**.147**	**.113**	**.113**	**.147**	**.113**	**.187**	**.147**	.000	.001	.000	.001	.001	.000	**.968**
24	**.002**	**.002**	**.123**	**.150**	**.150**	**.008**	**.123**	**.008**	**.008**	**.123**	**.123**	.002	**.150**	**.990**
25	.000	**.183**	**.084**	**.113**	**.183**	**.038**	**.084**	.000	.000	.000	**.020**	.000	.000	**.684**

Bold-faced: $p<.05$; bold-underlined: $p<.10$

Table 4.4 (Cont.): Significance and Relative Importance (ω^2) of Factors and Interactions (ANOVA)

ID	PE	FM	TI	TU	CA	MC	SC	TI*PE	TI*FM	TI*TU	TI*CA	TI*MC	TI*SC	Reliability
26	**.025**	**.004**	**.117**	**.088**	**.275**	**.229**	**.229**	.000	**.004**	**.004**	.000	**.004**	**.004**	**.984**
27	**.026**	**.081**	**.105**	**.059**	**.314**	**.105**	**.105**	.000	.000	**.041**	**.014**	.000	**.014**	**.910**
28	.000	**.070**	**.418**	.011	**.052**	**.138**	.000	.000	.000	.000	.000	.000	.000	**.607**
29	**.023**	**.052**	**.112**	**.036**	**.467**	**.090**	**.036**	.000	.000	.000	.000	.000	.000	**.828**
30	.000	.000	.009	.000	**.411**	**.186**	**.073**	**.073**	.000	.009	.000	.000	.009	**.776**
31	**.055**	**.101**	**.055**	**.055**	**.232**	**.232**	**.101**	**.011**	.000	**.037**	.000	.000	.000	**.903**
32	**.026**	**.026**	**.158**	**.058**	**.079**	**.395**	**.079**	.000	.006	**.041**	.000	**.014**	.006	**.872**
33	.000	.003	**.010**	**.126**	**.402**	.003	**.212**	.000	.003	**.062**	.000	.000	**.046**	**.843**
34	.000	**.077**	**.201**	.008	**.284**	**.201**	.008	.000	.000	.000	.000	.000	**.020**	**.778**
35	.000	**.334**	.000	.000	**.155**	**.121**	**.090**	.000	.000	.000	.000	.000	**.023**	**.743**
36	.000	**.261**	.000	.000	**.081**	**.191**	**.081**	.000	.000	.000	.026	.000	.000	**.506**
37	.000	**.038**	**.141**	.009	**.460**	**.058**	**.022**	.000	.009	.009	.000	**.022**	.000	**.794**
38	**.042**	**.172**	**.058**	.000	.000	.000	**.202**	**.202**	**.028**	**.016**	.007	**.028**	**.042**	**.797**
39	.000	**.003**	**.018**	**.044**	**.828**	.000	**.003**	.000	.000	**.003**	**.018**	**.003**	**.044**	**.970**
40	.005	.005	.053	.005	**.470**	.053	.005	.000	.005	**.017**	**.076**	**.053**	**.017**	**.753**
41	**.141**	**.030**	**.251**	**.160**	**.062**	**.332**	**.002**	.000	**.002**	.000	.000	.000	**.005**	**.992**
42	.000	**.083**	**.128**	**.154**	**.213**	**.246**	**.047**	.000	.000	**.033**	.004	.000	.000	**.945**
43	**.044**	**.262**	.007	**.044**	**.345**	**.061**	**.029**	.000	.000	.000	**.016**	.007	.007	**.851**
44	.000	**.109**	**.145**	.028	**.077**	**.077**	.028	.028	.000	.000	.000	.000	.000	.454
45	**.022**	**.042**	**.097**	**.067**	**.097**	**.397**	**.022**	**.097**	**.067**	.000	.000	.000	**.008**	**.915**
46	**.034**	**.130**	**.364**	**.065**	**.065**	**.216**	**.034**	.001	**.005**	**.013**	.000	**.013**	.000	**.938**
47	**.084**	**.326**	**.046**	.000	**.106**	**.031**	**.130**	.000	.000	.000	.000	.000	.000	**.642**
48	.002	**.195**	**.085**	**.009**	**.108**	**.307**	**.085**	**.018**	.000	**.031**	.000	.000	**.046**	**.873**
49	.000	.000	**.357**	.000	**.222**	**.118**	**.066**	.000	.000	.003	**.027**	.000	.000	**.746**
50	.002	**.056**	**.022**	.002	**.103**	**.543**	**.103**	.002	.002	.000	.002	.002	.002	**.813**

Bold-faced: $p<.05$; bold-underlined: $p<.10$

Table 4.4 (Cont.): Significance and Relative Importance (ω^2) of Factors and Interactions (ANOVA)

ID	PE[a]	FM	TI	TU	CA	MC	SC	TI*PE	TI*FM	TI*TU	TI*CA	TI*MC	TI*SC	Reliability
51	.000	**.053**	.000	.000	**.535**	**.015**	**.188**	.000	**.015**	.000	.000	.000	.000	**.824**
52	.000	.000	**.174**	**.041**	**.097**	**.221**	**.097**	.000	.000	.000	**.067**	.000	.000	**.815**
53	.000	.000	**.032**	**.046**	**.737**	**.046**	**.046**	.000	**.012**	**.012**	.000	.000	.000	**.937**
54	.000	**.202**	**.071**	**.129**	**.129**	**.164**	.002	.002	.002	.000	.002	.000	.000	**.664**
55	.000	**.257**	**.446**	**.033**	**.098**	**.021**	.005	.000	.000	**.012**	.000	.000	.000	**.904**
% of Sig. Cases (p<.05)	29	67	71	60	93	80	67	13	18	24	15	13	18	96
% of Sig. Cases (p<.10)	36	71	76	64	95	87	78	16	24	33	20	16	31	100
Mean Omega-Squared	.027	.092	.107	.062	.240	.163	.072	.011	.010	.013	.009	.004	.011	.820

Bold-faced: p<.05; bold-underlined: p<.10

[a] PE: Period of Exploration; FM: Financial Market Attractiveness; TI: Threat of Imitation; TU: Technological Uncertainty; CA: Customer Acceptance; MC: Managerial Capability; SC: Supporters' Commitments

Table 4.5: t-statistics and Z statistics for Factors and Interactions (Regression Analysis)

ID	Cons.	PE	FM	TI	TU	CA	MC	SC	TI*PE	TI*FM	TI*TU	TI*CA	TI*MC	TI*SC	Adj. R2
1	2.309	.000	-3.054	-.735	-2.443	6.719	4.275	1.222	-1.512	4.967	-.216	-1.512	.648	-1.944	**.826**
2	9.231	5.515	7.091	-2.737	-7.091	7.091	7.091	5.515	.557	-.557	-.557	.557	-1.671	.557	**.950**
3	4.380	-.351	-.351	.188	-1.756	5.267	3.160	4.565	.497	1.490	-1.490	-1.490	-.993	-1.986	**.754**
4	3.500	1.029	1.029	1.375	-7.203	9.261	9.261	5.145	-.728	.000	2.183	.000	-2.910	-2.183	**.923**
5	4.722	-.543	-1.630	-1.307	1.630	7.062	7.062	10.321	1.921	-.384	1.152	-2.689	-1.152	1.921	**.934**
6	2.725	.974	-.195	.417	-1.754	4.092	2.144	.585	-1.378	-.551	-.551	-1.378	-.551	1.654	**.556**
7	4.934	-1.958	3.264	-2.181	-3.264	4.569	.000	2.611	.692	.231	.692	-1.615	1.615	-1.615	**.768**
8	6.775	4.889	4.889	-2.178	-4.889	8.148	2.716	1.630	.384	-.384	-.384	-2.689	1.152	-.384	**.911**
9	2.553	6.755	1.192	-2.336	-5.166	1.987	7.550	-.397	.000	1.686	3.934	.000	-1.686	1.686	**.874**
10	2.234	.933	7.155	-.665	-.933	2.800	4.666	-.933	.440	-1.760	.440	.000	.880	1.320	**.817**
11	2.073	.968	-3.548	-2.672	-1.613	9.354	2.258	2.903	.228	4.790	2.053	-2.509	1.140	-.684	**.849**
12	2.479	1.215	2.186	.065	-.729	2.186	5.587	1.701	.172	-.859	-.859	-1.202	-.172	-.172	**.718**
13	5.158	1.197	-.239	-.896	-.239	2.155	.718	2.634	-1.016	.339	-.677	.677	.677	-1.016	**.471**
14	5.691	.655	2.619	1.400	.000	1.964	1.309	.000	-2.315	-1.389	-1.389	-.463	.926	.000	**.397**
15	1.768	1.560	7.798	-2.251	-2.183	5.303	.936	.936	-.662	-.221	.662	-.662	2.426	1.544	**.865**
16	2.494	.440	2.200	.353	-2.200	15.398	1.320	3.959	.311	-.311	-.311	-.933	.311	-3.422	**.939**
17	1.725	.351	1.756	-2.065	.351	5.969	7.374	1.756	-.497	2.979	.000	-.497	.497	-.497	**.879**
18	11.938	.471	-.471	-2.394	-6.128	.471	6.128	2.357	1.000	.333	-1.000	1.000	-.333	-.333	**.866**
19	8.048	-.926	.926	-3.712	-.926	8.332	.926	2.777	2.619	1.309	.655	-1.964	.655	.000	**.844**
20	6.147	2.232	1.594	-.938	-2.870	4.146	1.594	2.232	-2.029	.225	-1.127	-.676	-.225	-1.578	**.802**
21	5.337	4.707	2.353	-3.459	-8.237	3.530	4.707	3.530	-2.496	.832	5.824	-.832	-.832	.832	**.875**
22	2.971	.715	-1.429	-.859	.000	5.002	7.146	.000	-.253	2.779	.758	-.253	-.758	.253	**.810**
23	12.829	8.485	8.485	-3.402	-8.485	8.485	8.485	8.485	.000	-1.500	.000	-1.500	1.500	.000	**.968**
24	3.849	3.394	-3.394	1.134	-16.971	16.971	3.394	16.971	-3.000	3.000	11.400	-11.400	-1.800	-12.600	**.970**
25	3.436	.000	2.424	-.810	-3.030	4.243	1.818	2.424	.000	.857	.857	-1.714	-.429	-.429	**.670**

Bold-faced: $p<.05$ (F test for regression model)

Table 4.5 (Cont.): t-Statistics and Z statistics of Factors and Interactions (Regression Analysis)

ID	Cons.	PE	FM	TI	TU	CA	MC	SC	TI*PE	TI*FM	TI*TU	TI*CA	TI*MC	TI*SC	Adj. R2
26	17.105	5.657	.000	-4.914	-11.314	16.971	16.971	16.971	-1.000	3.000	3.000	-1.000	-3.000	-3.000	**.984**
27	2.150	2.438	3.251	-1.195	-4.876	7.315	3.251	4.876	-.862	-.287	3.161	-2.011	.287	-2.011	**.857**
28	5.751	.000	1.739	-2.730	-.869	1.739	2.174	.435	.768	.154	-.154	-.154	.461	.154	**.625**
29	3.339	2.132	1.523	-1.465	-2.132	5.787	3.351	2.132	-.862	.862	.431	.431	-.862	-.431	**.801**
30	4.382	-1.656	.000	-2.324	-1.656	4.968	3.312	3.312	3.220	.878	1.464	.293	.293	-1.464	**.755**
31	2.874	4.025	3.130	-2.390	-4.919	4.919	4.919	4.025	-1.897	.632	3.162	.632	.632	-.632	**.872**
32	4.079	2.698	.899	-2.524	-5.397	3.598	8.994	4.497	-.954	1.590	3.498	-.318	-2.226	-1.590	**.887**
33	3.288	.725	.000	-1.066	-6.525	7.249	.725	7.249	-.256	1.282	3.845	-.769	.256	-3.332	**.859**
34	4.264	.342	2.393	-1.645	-1.709	4.444	3.761	2.393	.000	.000	.967	.000	.000	-1.934	**.770**
35	2.337	-.976	3.579	.174	-.976	3.579	2.929	3.579	.460	.920	.460	-.920	-.460	-1.841	**.699**
36	1.321	.000	3.496	.409	-.437	3.059	2.622	2.185	.773	-.464	.773	-1.700	.155	-.464	**.569**
37	4.482	.697	.697	-2.796	-2.092	6.277	.697	2.092	.000	1.480	1.480	-.986	1.973	-.986	**.765**
38	3.919	-5.760	5.184	-3.464	-1.152	-.576	-1.728	5.760	5.499	-2.240	1.833	1.426	2.240	-2.647	**.784**
39	2.558	.967	.967	2.197	-2.901	20.307	-.967	2.901	-.342	.342	-1.709	-3.761	1.709	-5.812	**.959**
40	4.384	1.450	.000	-1.066	-2.175	7.974	.000	2.175	-.769	1.282	1.794	-3.332	2.819	-1.794	**.764**
41	21.071	-12.481	4.160	-8.450	-14.145	9.153	19.137	4.160	.000	2.353	1.177	-1.177	.000	-3.530	**.986**
42	5.210	.862	3.446	-.345	-2.585	6.892	6.031	3.446	-.305	.305	-3.351	-1.523	.305	-.914	**.901**
43	2.373	1.395	4.185	-.186	-1.395	6.975	3.487	.697	.986	.986	-.986	-1.973	-1.480	1.480	**.825**
44	5.509	-1.508	2.010	-2.351	-1.508	1.005	1.005	1.508	1.599	-.178	.533	.889	.889	-.533	**.437**
45	4.125	6.548	-.728	-1.167	-3.638	3.638	9.459	3.638	-6.174	5.145	.000	1.029	-1.029	-2.058	**.918**
46	8.007	3.803	7.062	-4.210	-5.975	3.803	9.235	2.716	-1.152	-1.921	2.689	.384	-2.689	.384	**.937**
47	1.677	2.102	3.970	-.999	-.234	2.569	1.635	2.102	.000	.000	.330	-.330	-.330	.661	**.665**
48	2.566	-.849	5.091	-2.495	-3.394	4.243	5.940	5.940	2.400	.000	3.000	-.600	.600	-3.600	**.880**
49	4.044	.669	.000	-1.698	-.669	5.350	3.344	2.675	-.236	.236	1.182	-2.128	-.709	-.709	**.758**
50	3.637	1.604	3.207	-.429	-.802	4.009	6.414	2.405	-1.134	-1.134	.000	-1.134	1.134	1.134	**.836**

Bold-faced: p<.05 (F test for regression model)

Table 4.5 (Cont.): t-Statistics and Z statistics of Factors and Interactions (Regression Analysis)

ID	Cons.	PE[a]	FM	TI	TU	CA	MC	SC	TI*PE	TI*FM	TI*TU	TI*CA	TI*MC	TI*SC	Adj. R2
51	1.042	.000	3.307	-.074	-1.102	6.614	.551	3.858	-.195	-1.754	.974	-.585	.974	-.195	**.780**
52	4.149	-.686	.000	-.458	-2.058	4.116	3.430	2.744	.728	-.728	.728	-2.668	-.243	-.728	**.658**
53	5.255	.993	-.993	-2.256	-4.966	12.911	3.973	3.973	-.351	2.458	2.458	-.351	-1.053	-1.053	**.928**
54	3.499	1.234	2.469	-1.402	-3.086	1.852	3.086	1.234	-1.091	1.091	.655	1.091	-.218	-.655	**.683**
55	6.591	.000	6.277	-3.542	-3.487	4.185	1.395	1.395	-.986	-.986	1.973	-.986	.493	-.493	**.869**
Sum	264.29	59.13	112.97	-85.52	-184.30	325.43	230.76	190.00	-9.20	33.21	57.41	-55.98	-.16	-57.67	44.25
Average	4.81	1.08	2.05	-1.55	-3.35	5.92	4.20	3.45	-.17	.60	1.04	-1.02	.00	-1.05	.80
Z scores	32.78	7.33	14.01	-10.61	-22.86	40.36	28.62	23.57	-1.14	4.12	7.12	-6.94	-.02	-7.15	

Bold-faced: $p<.05$ (F test for regression model)

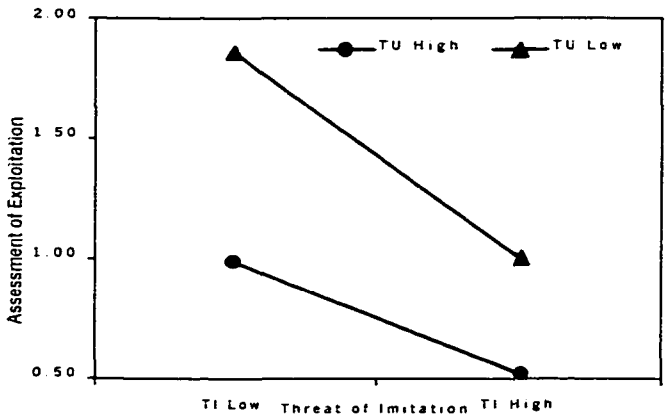
[a] PE: Period of Exploration; FM: Financial Market Attractiveness; TI: Threat of Imitation; TU: Technological Uncertainty; CA: Customer Acceptance; MC: Managerial Capability; SC: Supporters' Commitments

On the other hand, threat of imitation and technological uncertainty were associated with a lower likelihood of commencing full scale operations by entrepreneurs. The individual and aggregated means of regression coefficients are displayed in Appendix F. Four interaction effects out of six appeared statistically significant at the aggregate level of analysis. That is, threat of imitation's interaction with financial market attractiveness, technological uncertainty, customer acceptance, and supporters' commitment were significant at $p<.01$. To further understand the implications of the significant interaction effects, the significant interactions are plotted as shown in Figure 4.4.

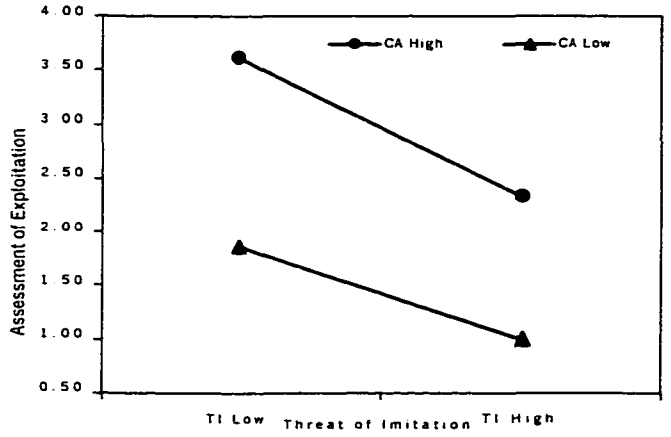
In Figure 4.4 (a), the low technological uncertainty positively affected the exploitation decision at a greater rate in the low threat of imitation, which leads to the significant and positive Z value (7.12, $p<.01$) for the interaction effect. In Figure 4.4 (b), the high customer acceptance positively affected the exploitation decision at a greater rate in the low threat of imitation, which leads to the significant and negative Z value (-6.94, $p<.01$) for the interaction effect. In Figure 4.4 (c), the high supporters' commitment positively affected the exploitation decision at a greater rate in the low threat of imitation, which leads to the significant and negative Z value (-7.15, $p<.01$) for the interaction effect. In Figure 4.4 (d), the low attractiveness of financial market negatively affected the exploitation decision at a greater rate in the high threat of imitation situation, which leads to the significant and positive Z value (4.12, $p<.01$) for the interaction effect.

Figure 4.4: Interaction Effects between Threat of Imitation and Main Factors

(a) Interaction Between Threat of Imitation and Technological Uncertainty



(b) Interaction between Threat of Imitation and Customer Acceptance



(c) Interaction between Threat of Imitation and Supporters' Commitment

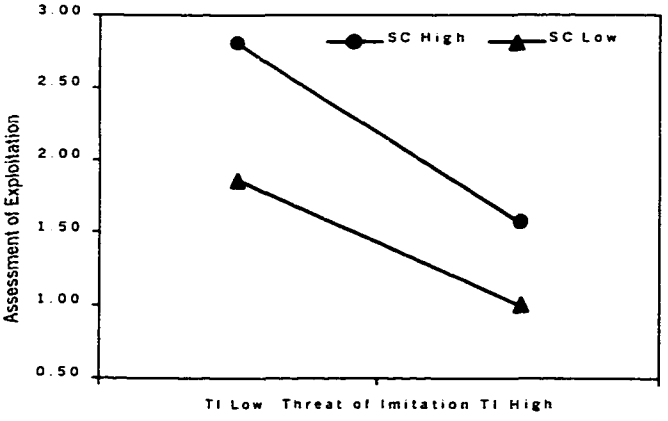
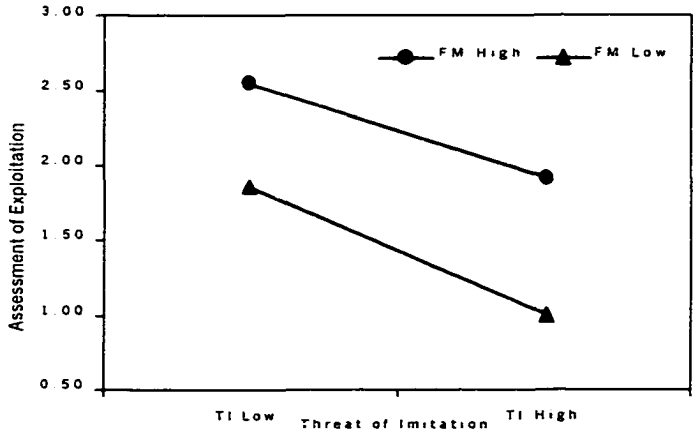


Figure 4.4 (cont.): Interaction Effects between Threat of Imitation and Main Factors

(d) Interaction Between Threat of Imitation and Financial Market

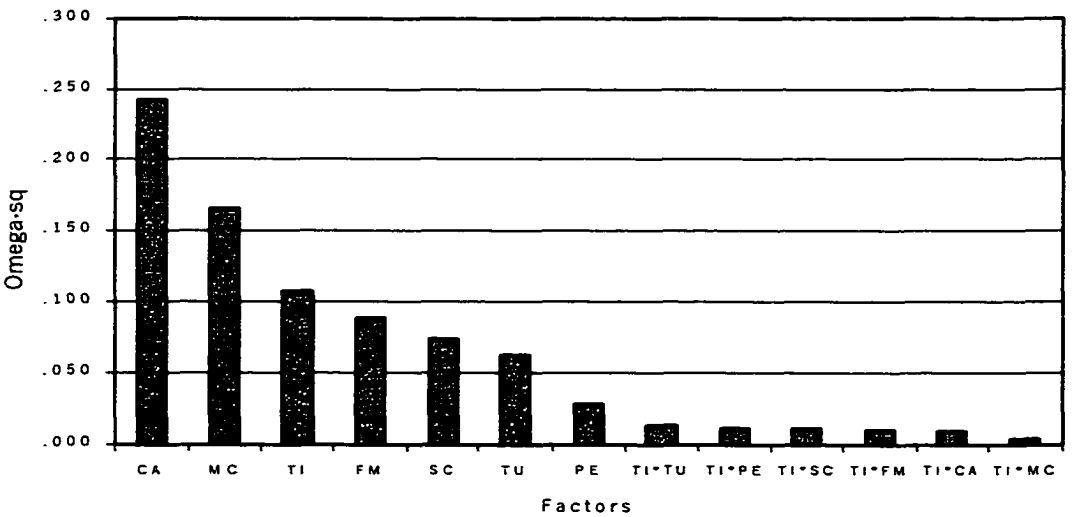


4.6.3 Size of Effect of Factors

Scenarios occur in which the results of a test can be statistically significant but the practical significance of the effect is minimal (i.e., the size of the effect is trivial). Magnitude estimation approaches such as Omega-Squared (ω^2) focuses attention on both the practical and statistical significance of an effect (Jaccard, 1998).

Consistent with the above methodological argument, each factor's statistical significance at the individual level, therefore, must be qualified by relative importance of its effect. I used a measure of explained variance - - Hays' (1973) omega squared value (ω^2) - - to assess relative importance of the seven factors and the two-way interactions. Each participant's ω^2 values for the seven factors and the six two way interactions were reported in Table 4.5. By aggregating ω^2 values across individual participants, the mean importance of the factors can be obtained. The size of effects, aggregated across individuals, is illustrated in Figure 4.5.

Figure 4.5: Mean Importance Weights of Factors and Interactions



As shown in Figure 4.5 and Table 4.5, customer acceptance was the most important factor, accounting for 24% of variance in entrepreneurs' decision making. This was followed by managerial capability, threat of imitation, financial market attractiveness, supporters' commitment, and technological uncertainty with 16%, 11%, 9%, 7% and 6% respectively. Period of exploration was the least important factor, explaining 3% of variance. Except the threat of imitation's interaction with managerial capability, each interaction of threat of imitation with the main effect factors explains 1.3%~1% of the variance in entrepreneurs' decision making. Threat of imitation's interaction with managerial capability accounts for .4% of the variance.

4.6.4 Reliability of Assessments

Pearson R correlations were computed between each participants' assessments of both the original and the 16 replicated profiles. The test-retest reliability coefficient is

shown in the far right column of Table 4.4 labeled 'Reliability". Ninety six percent of the entrepreneurs were significantly reliable in their responses at $p<.05$ - - one-hundred percent at $p<.10$. Mean test-retest correlation for the sample was .820. This is high relative to Shepherd's (1999) .69. This high degree of judgmental consistency provides further assurance that the new venture decision making task was performed consistently by the entrepreneurs.

4.7 SUMMARY OF HYPOTHESIS TESTS

4.7.1 Main Effects

4.7.1.1 Influence of Liability of Newness

Hypothesis 4.1a (Endogenous Technological Uncertainty):

The endogenous technological uncertainty of the new opportunity is negatively related to the likelihood of exploitation in the entrepreneurial process.

Supported: At the aggregate level of analysis, the level of endogenous technological uncertainty significantly affected entrepreneurs in their assessment of the likelihood of exploitation ($Z = -22.86$, $p<.01$). The aggregate Beta of –.87 is significantly less than zero, therefore entrepreneurs in their likelihood of exploitation assessments, assessed likelihood of exploitation higher for low endogenous technological uncertainty than high endogenous technological uncertainty.

Hypothesis 4.1b (Managerial Capability):

The managerial capability of the new venture team is positively related to the likelihood of exploitation in the entrepreneurial process.

Supported: At the aggregate level of analysis, the level of managerial capability significantly affected entrepreneurs in their assessment of the likelihood of exploitation ($Z = 28.62$, $p<.01$). The aggregate Beta of 1.17 is significantly greater than zero, therefore entrepreneurs in their likelihood of exploitation assessments, assessed likelihood of exploitation lower for low managerial capability than high managerial capability.

Hypothesis 4.1c (Customer Acceptance):

The customers' perceived cognitive legitimacy for the entrepreneur's products or services is positively related to the likelihood of exploitation in the entrepreneurial process.

Supported: At the aggregate level of analysis, the level of customer acceptance significantly affected entrepreneurs in their assessment of the likelihood of exploitation ($Z = 40.36$, $p<.01$). The aggregate Beta of 1.76 is significantly greater than zero, therefore entrepreneurs in their likelihood of exploitation assessments, assessed likelihood of exploitation lower for low customer acceptance than high customer acceptance.

Hypothesis 4.1d (Supporters' Commitment):

The commitment of supporters that entrepreneurs achieve is positively related to the likelihood of exploitation in the entrepreneurial process.

Supported: At the aggregate level of analysis, the level of supporters' commitment significantly affected entrepreneurs in their assessment of the likelihood of exploitation ($Z = 23.57$, $p<.01$). The aggregate Beta of .95 is significantly greater than zero, therefore entrepreneurs in their likelihood of exploitation assessments, assessed

likelihood of exploitation lower for low supporters' commitment than high supporters' commitment.

4.7.1.2 Influence of Threat of Imitation

Hypothesis 4.2:

The threat of imitation from potential competitors is negatively related to the likelihood of exploitation in the entrepreneurial process.

Supported: At the aggregate level of analysis, the level of threat of imitation significantly affected entrepreneurs in their assessment of the likelihood of exploitation ($Z = -10.61$, $p<.01$). The aggregate Beta of -.86 is significantly less than zero, therefore entrepreneurs in their likelihood of exploitation assessments, assessed likelihood of exploitation lower for high threat of imitation than low threat of imitation.

4.7.1.3 Influence of Contextual Factors

Hypothesis 4.3a (Previous Search Period Effect):

The period of exploration of the new opportunity is positively related to the likelihood of exploitation in the entrepreneurial process.

Supported: At the aggregate level of analysis, the level of the length of exploration significantly affected entrepreneurs in their assessment of the likelihood of exploitation ($Z = 7.33$, $p<.01$). The aggregate Beta of .27 is significantly greater than zero, therefore entrepreneurs in their likelihood of exploitation assessments, assessed likelihood of exploitation lower in short length of exploration than long length of exploration.

Hypothesis 4.3b (Financial Market Attractiveness):

The attractiveness of the financial market for the new venture is positively related to the likelihood of exploitation in the entrepreneurial process.

Supported: At the aggregate level of analysis, the level of the financial market attractiveness for new ventures significantly affected entrepreneurs in their assessment of the likelihood of exploitation ($Z = 14.01$, $p<.01$). The aggregate Beta of .69 is significantly greater than zero, therefore entrepreneurs in their likelihood of exploitation assessments, assessed likelihood of exploitation lower in unattractive financial market than attractive financial market.

4.7.2 Interaction Effects

Hypothesis 4.4a (Technological Uncertainty & Imitation threat):

Endogenous technological uncertainty is more negatively related to the likelihood of exploitation when the threat of imitation is low than when it is high.

Supported: At the aggregate level of analysis, the level of the threat of imitation significantly affected entrepreneurs in their assessment of the relationship between endogenous technological uncertainty and the likelihood of exploitation ($Z = 7.12$, $p<.01$). The aggregate Beta of .38 is significantly greater than zero.

Hypothesis 4.4b (Managerial Capability & Imitation threat):

Managerial capability is more positively related to the likelihood of exploitation when the threat of imitation is low than when it is high.

Not Supported: At the aggregate level of analysis, the level of the threat of imitation does not significantly affected entrepreneurs in their assessment of the relationship between managerial capability and the likelihood of exploitation ($Z = -.02$).

Hypothesis 4.4c (Customer Acceptance & Imitation threat):

Customer acceptance is more positively related to the likelihood of exploitation when the threat of imitation is low than when it is high.

Supported: At the aggregate level of analysis, the level of the threat of imitation significantly affected entrepreneurs in their assessment of the relationship between customer acceptance and the likelihood of exploitation ($Z = -6.94$, $p<.01$). The aggregate Beta of -.43 is significantly greater than zero.

Hypothesis 4.4d (Supporters' Commitment & Imitation threat):

Supporters ' commitment is more positively related to the likelihood of exploitation when the threat of imitation is low than when it is high.

Supported: At the aggregate level of analysis, the level of the threat of imitation significantly affected entrepreneurs in their assessment of the relationship between supports' commitment and the likelihood of exploitation ($Z = -7.15$, $p<.01$). The aggregate Beta of -.38 is significantly greater than zero.

Hypothesis 4.5a (Financial Market Attractiveness & Imitation threat):

Financial market attractiveness is more positively related to the likelihood of exploitation when the threat of imitation is high than when it is low.

Supported: At the aggregate level of analysis, the level of the threat of imitation significantly affected entrepreneurs in their assessment of the relationship between

financial market attractiveness and the likelihood of exploitation ($Z = 4.12$, $p<.01$). The aggregate Beta of .23 is significantly greater than zero.

Hypothesis 4.5b (Period of Exploration & Imitation threat):

The period of exploration is more positively related to the likelihood of exploitation when the threat of imitation is low than when it is high.

Not Supported: At the aggregate level of analysis, the level of the threat of imitation did not significantly affected entrepreneurs in their assessment of the relationship between period of exploration and the likelihood of exploitation ($Z = -1.14$). The aggregate Beta of -.17 is insignificant.

4.8 SUMMARY OF RESULTS

Through hypothesis testing in the conjoint experimental design, factors and their interactions influencing entrepreneurs' exploitation decision were revealed. The results indicate the following relationships.

A new venture's liability of newness is negatively associated with the entrepreneur's likelihood of exploitation. Specifically, a new venture's endogenous technological uncertainty is negatively associated with the entrepreneur's likelihood of exploitation; a new venture's lack of managerial capability is negatively associated with the entrepreneur's likelihood of exploitation; lack of customers' cognitive legitimacy for the new venture's products is negatively associated with the entrepreneur's likelihood of exploitation; lack of supporters' commitment to a new venture is negatively associated with the entrepreneur's likelihood of exploitation. Potential competitors' threat of imitation of the new opportunity is negatively associated with the entrepreneur's likelihood of exploitation.

The internal and external contexts of the entrepreneurial initiative are positively associated with the entrepreneur's likelihood of exploitation. Specifically, a new venture's exploration period is positively associated with the entrepreneur's likelihood of immediate exploitation; financial market attractiveness for new ventures is positively associated with the entrepreneur's likelihood of exploitation.

The influences of the dimensions of the liability of newness on the entrepreneur's likelihood of exploitation is moderated by the level of imitation threat. Specifically, the influence of endogenous technological uncertainty on the entrepreneur's likelihood of exploitation is greater in low imitation than in high imitation situations; the influence of the customers cognitive legitimacy (acceptance) on the entrepreneur's likelihood of exploitation is greater in low imitation than in high imitation situations; the influence of the supporters' commitment on the entrepreneur's likelihood of exploitation is greater in low imitation than in high imitation situations. The influences of financial market attractiveness on the entrepreneur's likelihood of exploitation is greater in high imitation than in low imitation situation.

The results of this Chapter provide implications on the determinants of entry timing, possible decision biases, the resolution of the decision dilemma (i.e., trade-off between mortality risk and potential profitability), and entrepreneurship education. Implications of this research to scholars and practitioners are detailed in Chapter 5.

CHAPTER 5: DISCUSSION AND CONCLUSION

In this Chapter, I overview the results of this dissertation and discuss how the theme of each Chapter has made a substantial contribution to the literatures of entrepreneurship and strategic management. In addition, I discuss practical implications for entrepreneurs and conclude this dissertation.

5.1 OVERVIEW OF RESULTS

This dissertation addresses gaps in our understanding of entrepreneurs' and stakeholders' decision making on important events in the entrepreneurial process. Particularly, I applied population level notions such as the liability of newness and the honeymoon period to the individual entrepreneur/firm level. This research attempted to undertake the following three main tasks, which are directly related to the research questions in Chapter 1:

1. To define the liability of newness from stakeholders' perspectives, as dimensions of mortality risk;
2. To analyze how mortality risk of new ventures impacts important decisions influencing the overall performance of the new venture in the entrepreneurial process (i.e., timing of exploitation decision in the context of this dissertation);
3. To examine, through entrepreneurs' decision policies, the role of mortality risk (as defined with the liability of newness) in the exploitation decision.

To better fulfill the different requirements of these themes, the dissertation utilized three different research methods - - protocol analysis, analytical modeling, and conjoint analysis. The results of the Chapter 2 suggest: the liability of newness may

consist of four dimensions - - reliability, accountability, legitimacy, and commitment - - and stakeholders' perceptions of these dimensions matter in their decision to be involved with the new venture. Thus, these four dimensions of the liability of newness can represent dimensions of a new venture's mortality risk.

The results of the Chapter 3 suggest: since uncertainty is the driving force of mortality risk as well as profit potential, there might exist an uncertainty threshold that indicates the optimal time to exploit a new opportunity. Model parameters reflecting structural properties of knowledge creation and imitation in the entrepreneurial process affect the exploitation timing decision. In particular, the model prescribes that exploration cost, influence of lead time on profit potential, and marginal effect of time on mortality risk are positively related to the exploitation timing. The importance of mortality risk in the performance function, and irreducible uncertainty gap (i.e., the potion of knowledge that is difficult for potential competitors to imitate) are negatively related to the exploitation timing. Uncertainty reduction per unit of knowledge and reducible uncertainty (i.e., the potion of knowledge that is subject to imitation) are both positively and negatively related to the exploitation timing, as the direction of their influence is determined by the relative impact of these factors on the reduction in mortality risk and profitability.

The results of the Chapter 4 suggest: as it is revealed that mortality risk is a salient element of new venture performance, entrepreneurs significantly assess the elements of mortality risk (i.e., dimensions of the liability of newness) in the exploitation decision. The dimensions of the liability of newness are negatively related to the entrepreneur's assessment of the exploitation decision. These results suggest that the liability of

newness and mortality risk do matter in the exploitation decision. As a result, they will matter in the development of new ventures.

Throughout this dissertation, I defined the liability of newness at the individual venture level, examined the usefulness of the notion in enhancing our understanding of the optimal timing of a new opportunity exploitation in the entrepreneurial process, and investigated the significant role of the dimensions of the liability of newness in entrepreneurs' exploitation decision. Thus, the objectives of this dissertation have been met. In the next two sections, I explore theoretical contribution in which future research is also discussed, and practical implications of each theme. In the final section, I conclude the dissertation.

5.2 IMPLICATIONS FOR THEORY DEVELOPMENT

5.2.1 Defining the Liability of Newness at the Individual Level

First, this dissertation defined the liability of newness at the individual level. Population ecology studies have been criticized in that they use unclear definitions and weak measurement - - for example, density is used as a proxy for cognitive legitimacy, and firm age for the liability of newness (Young, 1988; Zucker, 1989). This is because these studies rely on a macro perspective. Therefore, there has been little discussion of the liability of newness from a more micro perspective (see Venkataraman & Van de Ven [1998] for an exception). A verbal protocol analysis with stakeholders appears to support the proposed dimensions of the liability of newness in this dissertation, namely, reliability, accountability, legitimacy, and commitment. Thus, those dimensions of the liability of newness construct can be further used in the future studies of entrepreneurship

at both the individual entrepreneur and venture level of analysis, leading to more precise research than using proxy variables such as firm age.

Second, this dissertation also showed how entrepreneurship researchers adopt and redefine a macro level notion to investigate research questions at the individual level of analysis. One can further attempt to define a notion useful at the individual level at the aggregate level of analysis. For example, the notion of self-efficacy, an individual psychological property, has been applied at the team/group level of analysis to explain team learning or performance (e.g., Edmondson, 1999). Entrepreneurship scholars may define individual entrepreneurial properties at the team or organizational level, which can be used to explain entrepreneurial phenomena at the organizational level.

Third, the dissertation contributes to the decision making literature in entrepreneurship by showing that stakeholders' perception of the liability of newness matters in their decision making. Since entrepreneurial activities, such as building new firms in situations of resource restriction, are socially constructed, the perspective of stakeholders who possess resources is critical. However, the entrepreneurship literature has largely ignored a theory of stakeholders in entrepreneurship. For example, scholars examined how entrepreneurs use biases and heuristics in viewing and dealing with risks of starting new ventures (e.g., Busenitz, 1999). However, stakeholders' perception of new venture involvement had not been sufficiently examined.[13] If researchers do not understand how stakeholders view risks associated with the new venture, then it would be

[13] In a study of Sarasvathy, Simon and Lave (1998), entrepreneurs are compared with bankers in their perception and management of a variety of risks.

ineffective to help entrepreneurs develop strategies to deal with stakeholders in garnering resources.

5.2.1.1 Future Research

The research in Chapter 2 can further contribute to the literature through extension as follows: First, I conjecture that a new venture's strategies and founding conditions may affect stakeholders' perceptions and decisions. For example, high technological or marketing innovativeness, which requests a change in consumption behaviors and business operations, may seem morally illegitimate to distributors but beneficial or even exciting to customers and potential employees. Thus, the influence of new ventures' strategy and founding conditions on stakeholders' perception of the liability of newness needs further investigation.

Second, one can investigate how environmental factors such as industry development stage or organizational density might moderate stakeholders' perceptions. To the extent that stakeholders' perceptions vary with stage of industry development, an entrepreneur may be able to institute risk reduction strategies most appropriate for that stage of development.

Third, a more direct method is needed to examine the relationship between stakeholders' perceptions and their decision policies. Conjoint analysis represents an appropriate technique and will likely produce valuable insights. For example, using hypothetical venture profiles indicating different combinations of the newness dimensions, one can reveal how a certain stakeholder group's investment decisions are influenced by both the liabilities of newness and why the relationship differs from those in other stakeholder groups. One can also compare the decision policies of venture

capitalists, who tend to focus on more established ventures, with those of business angels, who are willing to fund ventures in the seed and start-up stages (Bygrave & Timmons, 1992). Both groups use similar criteria - - for example, the quality of the management team and market potential (MacMillan et al., 1985; Mason & Harrison, 1994) - - yet they arrive at significantly different investment decisions.

Finally, I encourage other scholars to further explore the advantages that a new venture has over established businesses. Focusing on assets rather than liabilities will be of considerable practical importance to entrepreneurs who can leverage these perceived benefits to garner precious resources from potential and existing stakeholders. I also encourage other scholars to conduct both more exploratory research and more fine-grained empirical testing. Researchers may need to clarify further the proposed dimensions (and their relationships). This could be done empirically by using factor analysis on a multi-item and multi-dimensional test.

5.2.2 Analyzing Optimality in the Opportunity Exploitation Decision

I propose an optimal stopping rule for an entrepreneur's decision on when to stop exploring an opportunity and begin exploiting it in order to optimize potential profitability, mortality risk, and exploration costs.[14] The model characterizes the effects of various environmental/industrial factors (such as the length of a new venture's lead time and the nature of imitation) on the time to begin exploitation. The myopic but dynamic decision-making rule drawn from the optimal stopping principle extends our

[14] One may consider that the conceptualization of the entrepreneurial process in Chapter 3 is similar to the new product development process. Since the new product development literature, however, usually addresses product development issues within established firms, the literature ignores mortality risk of a new venture and thus most dimensions of the liability of newness.

understanding of a fundamental issue in entrepreneurship: Rumelt (1987) asserts that entrepreneurial rent is the result of *ex ante* uncertainty. I believe that the field of entrepreneurship has paid insufficient attention to the level of uncertainty an entrepreneur should face to maximize her/his performance. The dynamic decision rule presented in Chapter 3 suggests that the entrepreneur, in deciding whether to continue exploration, should compare the marginal values of benefit (mortality reduction) and costs (lost return in profitability and exploration cost) for each time period.

The irreducible uncertainty gap between entrepreneurs and potential competitors is worthy of attention. Our model prescribes that an entrepreneur should delay exploitation as the irreducible uncertainty gap increases. This prescription challenges the current literature in strategic management and economics, which implies that early entrants with a long lead time build strong first mover advantages (e.g., Carpenter & Nakamoto, 1989, Huff & Robinson, 1994, Schmalensee, 1982), and hence obtain early cash inflows (Jovanovic & Lach, 1989). Furthermore, first mover advantages (including the lead time effect) are temporal (Lieberman & Montgomery, 1998) and barriers to imitation (i.e., uncertainty gap in this Chapter's context) decay because of attritional effects of continued competitive action (Reed & DeFillippi, 1990). Taken together, these studies seem to imply that if the entrepreneur can obtain a long lead time, then s/he is more likely to exploit the opportunity early.

However, these studies ignore two important aspects of the entrepreneurial process. First, although earlier exploitation likely produces earlier cash inflows, it may also increase the chances of venture mortality. Many studies exhibit survivor biases - - "Forty-seven percent of market pioneers fail. In comparison, other researchers have

found no pioneers that failed, or have not considered the survival problem to be serious" (Golder & Tellis, 1993: 169). Second, the factors that provide a long lead time may or may not be reducible by a potential competitor's observation of the entrepreneur's exploration activities. Our framework explicitly models uncertainty and how it evolves over time and also depicts how a lead time is formed and influenced by potential competitors' actions. A large increase in the irreducible uncertainty gap significantly diminishes the urgency to begin exploitation because it forces competitors to undertake their own exploration. The entrepreneur can thus delay exploitation until they do so. In contrast, the relative impact of the reducible uncertainty on potential profitability reduction and mortality risk reduction also influences entrepreneurs' exploitation decision.

Our model suggests that the profit potential reduction should be compared with the adjusted exploration cost. That is, an entrepreneur should compare the net benefits of being in exploration - - the advantage of reducing mortality risk (associated with irreducible uncertainty) - - with the disadvantages of reducing potential profitability (associated with reducible uncertainty) and of suffering additional exploration cost. Taken together, the model propositions in Chapter 3 extend our understanding of why industry or the entrepreneurial process matters in determining entry timing (Schoenecker & Cooper, 1998). This Chapter models important industry facets (i.e., knowledge creation and imitation environments) that have been relatively unexplored in previous research (c.f., Schoenecker & Cooper, 1998).

5.2.2.1 Future Research

This research should be extended to empirical studies, particularly by developing measures of state variables and model parameters. One of the important measurement issues is how to measure the level of uncertainty at a given point in time. Since the level of uncertainty is defined in the present Chapter as a linear combination of initial uncertainty and knowledge creation, one can measure it by observing knowledge creation (e.g., number of patents [Spender & Grant, 1996]). This approach can be supplemented by the method adopted by new product development studies (e.g., Yap & Souder, 1994), which measured uncertainty with multiple questionnaire items. By assessing endogenous and exogenous business environments with multiple questionnaire items in each period of exploration, one can measure both the current level and the change of uncertainty.

Another important issue is how to measure mortality risk. In Chapter 2, I proposed four dimensions of the liability of newness and examined the validity of those dimensions from stakeholders' perception. Since the perspective of stakeholders who possess resources is critical to the survival of the new venture, the dimensions of the liability of newness examined with key stakeholders well represent the notion of the mortality risk of a new venture. I suggest that those dimensions of the liability of newness be used for a mortality risk measurement. There exist various ways to develop measurement tools for the dimensions of the liability of newness. In strategic management, scholars (c.f., Ruefli et al., 1999) use primary data collection methods, such as surveys, questionnaires, and analysts' assessment, to measure business risk. Also, expert opinion such as venture capitalists' assessment would be an appropriate measure (e.g., Shepherd, 1999).

Further studies also need to be focused on different types of business environments or entrepreneurial processes that lead to different values for the model parameters. For instance, the difficulty for a competitor to decrease reducible uncertainty will be influenced by the degree of knowledge impactedness (e.g., e-commerce vs. specialized chemical industry) and the potential competitor's absorptive capacity. Potential competitors who possess a high absorptive capacity in terms of complementary assets and related knowledge base (Cohen & Levinthal, 1990) would have less difficulty decreasing reducible uncertainty.

5.2.3 Investigating Exploitation Through Entrepreneurs' Decision Policies

Throughout Chapter 4, I made a few but important contributions to the literatures of entrepreneurship and strategic management of new ventures. First, this Chapter provides an integrated view in which entrepreneurs' exploitation decisions are framed through assessments of mortality risk (as the liabilities of newness), potential profitability (as the threat of imitation) and contexts (temporal pacing and financial market condition). While each element of the framework has been emphasized in organization theory and strategic management, each forms a separate research stream. For example, the notion of the liability of newness has been a dominant perspective for population ecology scholars to explain organizational mortality rates (Stinchcombe, 1965; Henderson, 1999; Brüderl & Schüssler, 1990; Freeman, Carroll, & Hannan, 1983; Mitchell, 1991). The notion, however, has not been applied to how it influences an individual entrepreneur's decision making in strategic decisions such as opportunity exploitation. This dissertation, to the author's knowledge, is the first attempt to do so in entrepreneurship. Moreover, contextual factors appear to influence entrepreneurs' strategic decisions, as revealed in

the pacing of a new venture's strategic change (Gersick, 1994) and in the bandwagon movement of new firm foundings (Low & Abrahamson, 1997). In fact, Low and Abrahamson (1997) suggest that entrepreneurship scholars should pay more attention to the contextual influences on new business formation. This dissertation is an attempt to do so in a decision making experiment.

Second, the literature on first mover advantage and entry strategy has considered firm resources and capabilities as a determinant of entry timing and pioneering (Schoenecker & Cooper, 1998; Lieberman & Montgomery, 1998). Chapter 4 complements this research trend by having identified what factors entrepreneurs of the new venture emphasize in exploitation decision. One can thus better understand the relationship between specific types of resources and their influence on entry timing. The result of Chapter 4 implies that new ventures possessing more resources - - which reduce endogenous technological uncertainty, increase managerial capability, increase customers' cognitive legitimacy, and/or build supporters' commitment - - are more likely to commence exploitation early.[15]

Third, the negative relationship between the threat of imitation and the likelihood of exploitation found in Chapter 4 indicate how entrepreneurs think of lead time - - they seem to prefer the lead time given in the situation of non-competition (i.e., less imitation threat). That is, they may consider that with high threat of imitation they will be unsuccessful to obtain enough of a lead time, i.e., one to create a sustainable first mover advantage (c.f., Datar et al., 1997). Thus, the result of the negative relationship between

[15] Then, the next question would be how new ventures possess or build those kinds of resource. This issue is discussed in the next section on managerial implications.

the threat of imitation and exploitation assessment may empirically imply that a threshold of lead time is present in the entrepreneur's strategic decision framework. In fact, this strategic behavior has been expected in the analytical modeling approach of Chapter 3. As conceptualized in Chapter 3, lead time of an entrepreneur is a function of the uncertainty gap; as the threat of imitation increases the uncertainty gap decreases; and thus lead time for the entrepreneur decreases. Thus, with regard to the threat of imitation, entrepreneurs seem to act consistent to the rational behavior suggested in Chapter 3. Equivalently, these results strongly imply that the logic of the argument made on the relationship between the threat of imitation and lead time (thus profitability) in Chapter 3 has validity.

Finally, the moderating effects of the threat of imitation on the relationship between the liability of newness and the exploitation decision suggest a way of understanding how entrepreneurs resolve the decision dilemma (i.e., trade-off between mortality risk and potential profitability). The most preferred situation for entrepreneurs is the combination of low liability of newness and low threat of imitation. It is interesting to compare the situations of the trade-off (i.e., high liability of newness and low imitation threat vs. low liability of newness and high imitation threat). According to an examination of interaction effects (Table 4.5 and Figure 4.4), entrepreneurs showed close estimated values for the assessments on the two situations. Thus, entrepreneurs seem to adopt a decision policy in which mortality risk and potential profitability are almost equally assessed. That is, mortality risk is considered as important as potential profitability, which support the arguments of this dissertation and the strategy management literature - - decision makers in companies seem to seek a balance between

risk and return in their investment and strategic decisions (Bowman, 1982; Radner & Shepp, 1996; Schoemaker & Amit, 1994).

5.3. MANAGERIAL IMPLICATIONS

5.3.1 Knowing Stakeholders' Concerns and Signaling the Right Information

Since stakeholders perceive the liability of newness and their perception seems to influence their decision on their involvement with the new venture, entrepreneurs should devise a strategy to influence stakeholders' perceptions. The exploratory results of Chapter 2 may provide guidelines for entrepreneurs to devise such a strategy. An entrepreneur needs first to identify the most immediate stakeholders for a proposed venture and second to identify the aspects of newness (both liability and asset) that are most salient to each stakeholder group. The entrepreneur can then institute risk reduction strategies to address the most pressing concerns (perceived liability) and highlight any assets of newness that the stakeholders value. That is, the entrepreneur should be able to send the "right" signal to each stakeholder group.

Thus, the following suggestions based on the results shown in Table 2.5, will be useful for entrepreneurs. Customers likely perceive that the new venture lacks reliability and pragmatic legitimacy, and at the same time consider that the new venture's product will be pragmatically useful. Thus, entrepreneurs should emphasize to customers that their products or services are reliable and practically useful. Entrepreneurs should devise ways to enhance product quality and deliver value to customers.

Potential employees likely perceive that the new venture lacks accountability and pragmatic legitimacy, and at the same time they probably like what the new venture is

pursuing and want to be part of the initiative. Thus, entrepreneurs should clearly define their human resources principles and philosophy and start early to institute routines that increase organizational accountability. Entrepreneurs may need to stress that potential employees can achieve more financial freedom with the new venture in the long run. Not only that, entrepreneurs will benefit from emphasizing their particulars that increase potential employees' affective commitment to them. For example, to attract high-caliber employees it might be useful to stress affective characteristics such as the entrepreneur's vision of future technology.

Distributors likely perceive that the new venture lacks accountability and all three legitimacies (cognitive, pragmatic, and moral) and no assets of newness. Thus, entrepreneurs should approach distributors carefully with the expectation that they tend to examine various aspects of the new venture. Thus, to be effective in a negotiation with the distributor, entrepreneurs may need to stress not only their product's advantages but also the new venture's accountability (e.g., managerial capability to meet the distributor's requirements to maintain long-run relationship). Moreover, the new venture should consider the fit between its product and the normative business areas of the distributor.

Bankers likely perceive that the new venture lacks accountability and pragmatic and moral legitimacies and no assets of newness. As one expects, bankers are concerned with the new venture's accountability and their domain of business. Thus, entrepreneurs should meet bankers' accountability examination through various ways such as rationality in business plan, individual credibility, and organizational routines.

In sum, adopting a number of different stakeholder perspectives and emphasizing different aspects of the new venture to different stakeholders will help the entrepreneur access stakeholders' resources.

5.3.2 Knowing Uncertainty Threshold and Managing Performance Trade-Offs

Scholars and practitioners involved in entrepreneurship have well recognized the high failure rates of new ventures. Nevertheless, the lack of attention to the role of mortality risk in the entrepreneur's decision process likely leads us to misleading implications. For instance, if mortality risk is removed from our framework (i.e., $\pi = 0$ in Equation 7), then the decision will be to exploit the new opportunity immediately - - a sub-optimal decision, as both Proposition 3.1 and the current failures of Boo.com and Value America suggest. Thus entrepreneurs should include mortality risk in their performance function and avoid biases in assessing the relative importance of potential profitability in the performance function.

Since the diffusion of the knowledge related to the new opportunity to stakeholders and potential competitors may reduce both mortality risk and potential profitability, entrepreneurs should be able to manipulate the degree and type of the knowledge diffusion so that the new venture's performance is maximized. This means that entrepreneurs may have occasions in which to purposefully provide the knowledge to potential competitors. For example, in the very early development of a new industry, the pioneer may need to proactively provide the public (and even potential competitors) some technical details and advantages of the new technology, in order to increase the legitimacy of the industry. For some initial periods, this activity may contribute to the performance by reducing mortality risk greater than the reduction in potential profit.

In organizing the knowledge related to the new opportunity, entrepreneurs should make some portion of their knowledge invisible to potential competitors so that it remains in an irreducible form. The degree of impactedness of their knowledge may differ along the phases of the entrepreneurial process and may depend on the new ventures' capability. In the early entrepreneurial process, they may need to diffuse more knowledge about the new opportunity to attract stakeholders (thus increase legitimacy), whereas in the later entrepreneurial process where substantial support from environment is attained they may need to diffuse less knowledge. When making decisions on these issues, entrepreneurs, this research suggests, should always consider their strategic actions' trade-off between mortality risk and potential profitability.

5.3.3 Knowing Exploitation Policy and Preparing Exploitation

In the situation in which studies of the decision analysis of entrepreneurs' strategic behaviors are limited, the results of Chapter 4 can provide useful implications for both entrepreneurs and stakeholders involved in the new venture. Entrepreneurship educators may also consider the results of the research in teaching new venture strategy.

The results of the research in Chapter 4 indicate that technological entrepreneurs significantly consider the seven factors proposed in this dissertation. In fact, the four dimensions of the liability of newness explained 55% of the variance in the entrepreneurs' assessment. The emphasis placed on the dimensions of the liability of newness indicates how important it is for entrepreneurs to build new venture's capabilities in various areas of business activity. That is, entrepreneurs showed that the exploitation decision is likely made in multi-dimensional assessments of the internal capabilities, rather than simply relying on single technological capability related to the

new opportunity. This result implicitly implies that entrepreneurs try to avoid failure in their exploitation attempt. For example, Value America and Boo.com, which were very successful at the beginning and failed in the expansion of their business (i.e., exploitation), failed partly because they ignored the liability of newness factors. Therefore, entrepreneurs benefit from the conceptualization of the liability of newness proposed in this Chapter - - i.e., endogenous technological uncertainty, managerial capability, customer acceptance, and supporters' commitment. Moreover, they should consider generalized dimensions of the liability of newness presented in Chapter 2 - - reliability, accountability, legitimacy (cognitive, pragmatic, moral), and commitment (institutional, affective). As they rely on these dimensions of the liability of newness before they make the exploitation decision, they may more successfully manage exploitation than otherwise.

By the same token, inexperienced and nascent entrepreneurs will learn, through this dissertation, what factors entrepreneurs mostly consider in the exploitation decision; consequently they will be able to know what they might prepare for before making the exploitation decision. Furthermore, entrepreneurship educators and new venture helpers such as government agencies and incubators will be able to teach them how to handle each element of the exploitation factors.

The factors of the financial market attractiveness and period of exploration were positively related to the likelihood of exploitation. This indicates that entrepreneurs appear to be subject to internal and external contextual situations. Particularly, the positive relationship revealed in this research between the period of exploration and the likelihood of exploitation implies that entrepreneurs are subject to a sunk cost fallacy - -

the tendency of managers to consider nonrelevant prior costs when making future decisions (Whyte, 1986). Therefore, entrepreneurs should be careful with the biases associated with the sunk-cost fallacy, which leads them to a suboptimal decision on exploitation.

Financial market attractiveness appeared to create a possible decision bias to entrepreneurs, deriving from both the pressure of bandwagon effects and the perception of financial resources availability. Even though it would be true that financial resources are abundant in an attractive financial market, this does not mean that entrepreneurs are successful in exploitation implementation, if their new ventures are suffered from a higher level of the liability of newness. Recent demises of dot-com companies are evidence of both the influence of financial markets on exploitation and its consequences. Therefore, entrepreneurs should avoid an exploitation policy that heavily relies on financial market attractiveness. The results of Chapter 4 indicate that cautions are needed in entrepreneurs' exploitation policy - - the financial market attractiveness was the fourth most important factor out of seven, more important than supporters' commitment and endogenous technological uncertainty. It is interesting to recall that Boo.com failed partly because they could not solve technical problems, while the company was engaging in exploitation.

The significant moderating role of the threat of imitation indicates that entrepreneurs adopt contingency decision policies on exploitation. However, the interactions of the threat of imitation with managerial capability and period of exploration appeared insignificant. Since contingent relationships between entry and organizational/market strategies affect the performance of firms (Szymanski et al., 1995;

DeCastro & Chrisman, 1995; Kerin, 1992), entrepreneurs should be able to adopt an interaction decision policy, rather than just relying on main effects and/or contextual biases.

5.4 CONCLUSION

This dissertation contributes to the literatures of entrepreneurship and strategy, particularly in the areas of the mortality risk of new ventures and decision making in the entrepreneurial process. Two population level notions (i.e., the liability of newness and the honeymoon period) with which scholars revealed mortality patterns of new ventures are redefine and applied at the individual entrepreneur/firm level of analysis through three studies. This dissertation, as a whole, first defines dimensions of the liability of newness and provides exploratory evidence of those dimensions' validity as a representation of new ventures' mortality risk. Second, the role of mortality risk represented by the liability of newness is further revealed in the exploitation decision of new ventures. Both analytical and conjoint experiment studies of the dissertation reveal that the notion of mortality risk and its dimensions, which are represented by the liability of newness, explain entrepreneurs' strategic behaviors on the exploitation decision impacting the performances of new ventures. This dissertation can be directed toward further studies to clarify and more accurately understand the phenomenon in the early life of a new venture. Further conceptual and empirical studies on such subjects as the liability of newness at the individual entrepreneur/firm level, mortality risk of new ventures, exploitation decision, and direct performance implications, will shed a new light on the understanding of the early life of the new venture.

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APPENDIX A: VERBAL PROTOCOL INFORMATION SHEETS

[For Potential Employees]

In this experiment we are interested in what you think about a decision making question. I am going to ask you to THINK ALOUD as you work on the question given. What I mean by "think aloud" is that I want you to tell me (yourself) EVERYTHING you are thinking from the beginning until you give an answer. I would like you to talk aloud CONSTANTLY from the time I present each problem until you have given your final answer to the question. I do not want you to try to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself. It is most important that you keep talking.

Question: Assume that you receive a job offer from a new venture company, called SOHO Communications, founded in 1997. After reviewing the new venture profile (attached), what is your decision about the job offer?

Note 1: While you are making your decision, you can phrase questions, descriptions, preconceptions, recollections, inferences, and comments for yourself.
Note 2: You may need more information to make your decision. However, assume that the attached profile is the best information you can get from various sources. Your decision can take various forms such as acceptance, rejection, or whatever decision you made.

Venture Profile

Company: SOHO Communications, Inc. (Founded in 1997)
Founders: * Martin Shane, Engineer
* Charles Bradford, Former vice-President of a computer company

Product: Entrepreneur Call Manager (ECM) for small offices and home offices (SOHO) (Unit Price: $495/Unit)
Function: As calls (including cellular phone) arrive the ECM sorts and directs them: faxes go to a fax machine and voice calls to voice mail or wherever the SOHO worker happens to be – at the desk, in the kitchen, on the road, with a client, or at the beach. The ECM also permits SOHO workers to monitor incoming calls undetected from any location.
Competitive Advantage: Enough time (three years) and capital (from Bradford and his friends) to develop a market-oriented product and a well-planned launch; a potent distribution partner (a regional phone company); pioneer in home office communications market.
Target Market: Includes small offices (10 people or fewer) and income-producing home offices. "You only have to be conscious to realize that something big is going on in this market," says SOHO chairman Charlie Bradford. In the US, there are more than 45 million small and home offices.
Current Status: The ECM was scheduled to debut this month, appearing in a mail order catalog. At the same time a regional telephone company would begin inserting sales literature in its customers' phone bills. Last fall, with about 100 beta units in the field, the feedback was encouraging.
Number of Employees: 19 employees

Estimated Financials:

($ million)	Year 1999	Year 2001	Year 2003
Revenues	$4.0	$27.0	$75.0
Gross profits	1.9	15.0	45.0
Marketing/sales	2.7	6.4	15.0
R&D	1.6	3.4	9.0
G&A	1.1	2.2	6.0
Profit (loss)	(3.5)	3.0	15.0

Employment Opportunity:
- Engineering/Research Fields: The ECM will become a whole lot smarter: maybe with electronic-mail, fax sorting, and video functions built in, maybe with its essential technology compressed into a single chip that comes preinstalled on the motherboard of your computer or inside your telephone.
- Marketing/Management Fields: The company will extend distribution channels such as catalog companies and retail outlets (e.g., Staples, OfficeMax) and will build strong planning and management capability.

[For Potential Customers]

In this experiment we are interested in what you think about a decision making question. I am going to ask you to THINK ALOUD as you work on the question given. What I mean by "think aloud" is that I want you to tell me (yourself) EVERYTHING you are thinking from the beginning until you give an answer. I would like you to talk aloud CONSTANTLY from the time I present each problem until you have given your final answer to the question. I do not want you to try to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself. It is most important that you keep talking.

Question: As a business owner, you come to know about a new venture's product. You find the following advertising information on the new product, ECM (Entrepreneur Call Manager), in a mail order catalog or in a telephone bill. The new venture's product is an option in the marketplace as you know it. After reviewing the product profile, what is your decision about purchasing the product?

Note 1: While you are making your decision, you can phrase questions, descriptions, preconceptions, recollections, inferences, and comments for yourself.
Note 2: You may need more information to make your decision. However, assume that the attached profile is the best information you can get from various sources. Your decision can take various forms such as acceptance, rejection, or whatever decision you made.

Product Profile

Company: SOHO Communications

Product: Entrepreneur Call Manager (ECM) for small offices and home offices (SOHO)

Price: $495/unit

Function: AS calls (including cellular phone) arrive the ECM sorts and directs them: faxes go to a fax machine and voice calls to voice mail or wherever the SOHO worker happens to be – at the desk, in the kitchen, on the road, with a client, or at the beach. The ECM also permits SOHO workers to monitor incoming calls undetected from any location.

An Example Usage of the Product: With an ECM and a second phone line, you can turn the cellular phone in your car into an extension of your home-office phone. What's different about the ECM from the phone company's service is that lets you listen in, undetected, on your car phone while the caller leaves a message. If you decide you want to talk, you punch a number and you're connected.

Shape of the Product: It looks like a modem: a gray box with red and green lights on the front and phone jacks in the back.

"*Creative solutions from a talented bunch of folks merging telephony, auto-attendant, live transfer (listen-in//monitor or announce) and a host of advanced options previously available only on expensive commercial pbx office systems. See their entire product line including message alert and Caller ID enhanced.*"

[For Distributors]

In this experiment we are interested in what you think about a decision making question. I am going to ask you to THINK ALOUD as you work on the question given. What I mean by "think aloud" is that I want you to tell me (yourself) EVERYTHING you are thinking from the beginning until you give an answer. I would like you to talk aloud CONSTANTLY from the time I present each problem until you have given your final answer to the question. I do not want you to try to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself. It is most important that you keep talking.

Question: As an owner or principle manager of a distributor company (or store), you are contacted by a marketing manager of a new venture, SOHO Communications, manufacturing a new product called ECM (Entrepreneur Call Manager). The new venture's product is an option in the marketplace as you know it. The new venture wants to display the ECM in your store and to make a supply contract. Now, assume you are in a position to make decision on this offer. After reviewing the venture and product profiles, what is your decision about making a contract?

Note 1: While you are making your decision, you can phrase questions, descriptions, preconceptions, recollections, inferences, and comments for yourself.
Note 2: You may need more information to make your decision. However, assume that the attached profile is the best information you can get from various sources. Your decision can take various forms such as acceptance, rejection, or whatever decision you made.

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Founders: * Martin Shane, Engineer
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Competitive Advantage: Enough time (three years) and capital (from Bradford and his friends) to develop a market-oriented product and a well-planned launch; a potent distribution partner (a regional phone company); pioneer in home office communications market.
Target Market: Includes small offices (10 people or fewer) and income-producing home offices. "You only have to be conscious to realize that something big is going on in this market," says SOHO chairman Charlie Bradford. In the US, there are more than 45 million small and home offices.
Current Status: The ECM was scheduled to debut this month, appearing in a mail order catalog. At the same time a regional telephone company would begin inserting sales literature in its customers' phone bills. Last fall, with about 100 beta units in the field, the feedback was encouraging.
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[For Bankers]

In this experiment we are interested in what you think about a decision making question. I am going to ask you to THINK ALOUD as you work on the question given. What I mean by "think aloud" is that I want you to tell me (yourself) EVERYTHING you are thinking from the beginning until you give an answer. I would like you to talk aloud CONSTANTLY from the time I present each problem until you have given your final answer to the question. I do not want you to try to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself. It is most important that you keep talking.

Question: An entrepreneur or finance manager of a new venture (SOHO communications) contacts you. This company is manufacturing a new product called ECM (Entrepreneur Call Manager). The new venture wants to receive a business loan (say, $500,000) from your bank. Now assume that you are in a position to make a decision on this loan application. Please review the venture and product profiles. What would be your decision?

Note 1: While you are making your decision, you can phrase questions, descriptions, preconceptions, recollections, inferences, and comments for yourself.
Note 2: You may need more information to make your decision. However, assume that the attached profile is the best information you can get from various sources. Your decision can take various forms such as acceptance, rejection, or whatever decision you made.

Venture Profile

Company: SOHO Communications, Inc. (Founded in 1997)
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APPENDIX B: PROOFS OF PROPOSITIOINS

Proof of Proposition 3.1

Derman and Sack's (1960) Theorem - Let $\{\Im_t, t=1,2,...\}$ be a sequence of σ-fields of a sample Ω with $\Im_t \subset \Im_{t+1}$, $t = 1,2, \ldots$. Let $\{O_t\}$ be a sequence of random variables with O_t measurable with respect to $\Im_t$ and such that EO_t exists and is finite for all t. Let Ψ be the class of all stopping rules such that $EN < \infty$. If there exists a stopping rule N^* with

(i) $EN^* < \infty$

(ii) $E[O_t | \Im_{t-1}] \geq O_{t-1}$ when $t \leq N^*(z)$

$\leq O_{t-1}$ when $t > N^*(z)$

for almost all $z \in \Omega$; and if there is some $\zeta < \infty$ such that

(iii) for all t, $E[\,|O_{t+1}-O_t|\,|\Im_t] \leq \zeta$,

then $EO_{N^*} = \max_{N \in \Psi} EO_N$.

Applicability of the Theorem - In the context of the present paper, the σ-field $\Im_t$ is generated by $(X_1, X_2, \ldots, X_t)$. The random variable O_t is the performance from exploiting the new business opportunity at period t with overall profit potential P_t, mortality risk M_t and exploration cost C_t, and it is expressed by

$$O_t = P_t - \pi M_t - C_t . \tag{A1}$$

Condition (i) is satisfied when the expected incremental benefit from delaying market entrance (due to a reduction in mortality risk) becomes eventually smaller than the expected incremental loss due to lost profit potential and additional exploration costs. The incremental benefit of delaying market entrance for exploitation (reduction in mortality risk) from one period to the next decreases as t increases, and ultimately approaches zero. The incremental loss in potential profit and exploration cost equals

$$(P_t - P_{t+1}) + (C_{t+1} - C_t) = \alpha(\alpha_2 - 1)X_{t+1} + c , \tag{A2}$$

which is expected to decrease over time since the knowledge creation is expected to decrease over time, and ultimately approaches to c with a large t. Therefore, condition (i) holds and the optimal entrance delay is expected to be finite.

Condition (ii) is equivalent to showing that, since U_t is a sufficient statistic for $\{X_1, X_2, \ldots, X_t\}$, there exists a stopping time N^* where

$$E[\phi+\omega(V_t-U_t)-\pi V_t e^{-\beta t}-ct|U_{t-1}] \geq \phi+\omega(V_{t-1}-U_{t-1})-\pi V_{t-1}e^{-\beta(t-1)}-c(t-1) \text{ when } t\leq N^* \tag{A3}$$

$$\leq \phi+\omega(V_{t-1}-U_{t-1})-\pi V_{t-1}e^{-\beta(t-1)}-c(t-1) \text{ when } t > N^*.$$

The expectation is taken on the random variables X_t from substituting U_t by (U_{t-1} - λX_t), as given by (1). Substituting the uncertainty gap using (3) and replacing $E[X_t]$ by μ_t offer an alternative form for (A3) where [16]

$$U_{t-1} \geq \frac{1}{\pi\alpha_2 e^{-\beta t}(e^{\beta}-1)}\left\{c+\omega\lambda(\alpha_2-1)\mu_t-\pi\alpha_1 e^{-\beta t}(e^{\beta}-1)-\pi\lambda\alpha_2\mu_t e^{-\beta t}\right\} \text{ when } t\leq N^* \tag{A4}$$

$$\leq \frac{1}{\pi\alpha_1 e^{-\beta t}(e^{\beta}-1)}\left\{c+\omega\lambda(\alpha_2-1)\mu_t-\pi\alpha_1 e^{-\beta t}(e^{\beta}-1)-\pi\lambda\alpha_2\mu_t e^{-\beta t}\right\} \text{ when } t > N^*.$$

To ensure that (A4) holds, I must verify that once the entrepreneur exploit the new opportunity (i.e., the threshold has been reached for the first time) the expected value of the uncertainty at any period following entry should not exceed the value of the threshold. It is sufficient to demonstrate that, for any t, $P(U_t > L^*(t+1) \mid U_{t-1} < L^*(t)) = 0$. One has, since X_t is non-negative and $L^*(t)$ is increasing over time,

$$P(U_t > L^*(t+1) \mid U_{t-1} < L^*(t)) = P(U_{t-1} - \ddot{e}X_t > L^*(t+1) \mid U_{t-1} < L^*(t))$$

$$= P(\ddot{e}X_t < U_{t-1} - L^*(t+1) \mid U_{t-1} < L^*(t)) \leq P(\ddot{e}X_t < L^*(t) - L^*(t+1) \mid U_{t-1} < L^*(t)) = 0.$$

Condition (iii) holds as long as the expected increment in performance from one period to the next is bounded. This condition is satisfied since P_t is bounded (and decreasing over time), $M_t \in [0,1]$ and c is finite.

Proof of Proposition 3.2

For part (a), (b) and (c), I am interested in the change on the acceptance interval from an increase in, respectively, the unit exploration cost, the marginal effect of uncertainty gap on profit potential and the marginal effect of time on mortality risk. I find, respectively,

$$\frac{\partial L^*(t)}{\partial c}=\frac{e^{\beta t}}{\pi\alpha_2(e^{\beta}-1)}>0, \quad \frac{\partial L^*(t)}{\partial \omega}=\frac{\lambda\mu_t(\alpha_2-1)e^{\beta t}}{\pi\alpha_2(e^{\beta}-1)}>0 \text{ and } \frac{\partial L^*(t)}{\partial \beta}>0.$$

[16] $E[O_t \mid U_{t-1}] = \phi+\omega\alpha_1+\omega(\alpha_2-1)U_{t-1}-\omega\lambda(\alpha_2-1)\mu_t-\pi\alpha_1 e^{-\beta t}-\pi\alpha_2 U_{t-1}e^{-\beta t}+\pi\alpha_2\lambda\mu_t e^{-\beta t}-ct.$

Proof of Proposition 3.3

For part (a) and (b), I am interested in the change on the acceptance interval from an increase in, respectively, the irreducible uncertainty (α_1) and the marginal effect of mortality risk on performance (π). I find, respectively,

$$\frac{\partial L^*(t)}{\partial \alpha_1} = -\frac{1}{\alpha_2} < 0 \text{ and } \frac{\partial L^*(t)}{\partial \pi} = -\frac{(c + \omega\lambda\mu_1\alpha_2 - \omega\lambda\mu_1)e^{\beta t}}{\pi^2\alpha_2(e^{\beta} - 1)} < 0.$$

Proof of Proposition 3.4

I am interested in the change on the acceptance interval from an increase in the marginal effect of knowledge on uncertainty reduction (λ). I find,

$$\frac{\partial L^*(t)}{\partial \lambda} = \frac{\mu_1(\alpha_2\omega e^{\beta t} - \omega e^{\beta t} - \pi\alpha_2)}{\pi\alpha_2(e^{\beta} - 1)} > 0 \text{ if and only if } \omega(\alpha_2 - 1) > \alpha_2\pi e^{-\beta t}.$$

Proof of Proposition 3.5

I am interested in the change on the acceptance interval from an increase in the difficulty for a competitor to decrease reducible uncertainty (α_2). I find,

$$\frac{\partial L^*(t)}{\partial \alpha_2} = \frac{(-c + \omega\lambda\mu_1 + \pi\alpha_1 e^{-\beta t + \beta} - \pi\alpha_1 e^{-\beta t})e^{\beta t}}{\pi\alpha_2^2(e^{\beta} - 1)} > 0 \text{ if and only if } \omega\lambda\mu_1 > c - \pi\alpha_1 e^{-\beta t}(e^{\beta} - 1).$$

APPENDIX C: SAMPLE CONJOINT QUESTIONNAIRE

Welcome to
A Survey of an Entrepreneur's Assessment of New Venture Opportunities

Purpose of the Research Project

The purpose of this survey is to better understand the investment decision of entrepreneurs in the process of assessing an opportunity and possibly growing a new business.

To better understand this important issue, you will be asked to assess the situation surrounding a series of hypothetical cases and make an assessment on **the likelihood that you will make a full scale investment toward the growth of the venture** (if you had to make a decision today). This research will help entrepreneurs develop strategies that will increase their venture's chance of survival and growth.

All information from this survey is strictly confidential and will only be reported in a way that individuals cannot be identified.

Thank you for agreeing to participate in this survey!!

Please direct comments on this survey to Young Rok Choi,
Lally School of Management & Technology,
Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY 12180.
Email: choiy3@rpi.edu; Phone: 518) 276-5659; Fax: 518) 276-8661

Instructions

Your Task

Since you are an entrepreneur, you are ideally qualified to make decisions to grow a new business. In this survey, you will be asked to consider 33 hypothetical new ventures and provide responses for each new venture on the likelihood of 'full scale' investment today.

The Situation

1. The general situation we consider in this survey is that since founding the new venture you have spent one or three year(s) exploring and searching for better products, businesses, and technological alternatives and have not taken the next step of a full scale investment. At some point in time, you may need to make decision on 'full scale' investment for a full scale operation, in order to obtain substantial profits from the new business.

2. The term 'full scale' investment refers to large and irreversible investments that are required for generating a full scale operation in your business context. For this survey, please assume that it costs $240,000 per year to execute exploring and searching activities, while the investment for generating a full scale operation will be $2.4 million.

3. When making these responses envision you are the founder of the hypothetical new venture being described. Please assume that the new ventures in this survey are in the industry in which you are currently engaged.

4. Although other information factors might further assist your assessment, please make the decision as best as you can based upon the information provided, under the assumption that all other factors are constant across all hypothetical cases.

Important Notes for Answering Procedure

1. We would like to emphasize that for this study there are no 'right' or 'wrong' responses.

2. We also ask that you consider each scenario as a separate situation, independent of all the others – please do not refer back to scenarios already completed.

3. We understand this survey may look like a lot to do, however, we have found that it takes about 30 minutes for most entrepreneurs to complete. It typically takes longer for the first few cases and less time per case thereafter.

4. It is important that you respond to all questions, as incomplete surveys cannot be included in the statistical analyses.

Description of Terms

(Variables Used in the Venture Profiles)

Terms	Levels	Descriptions
Period of Exploration (Search)	**Long**	Since founding the new venture, you have spent ***three years*** exploring and searching for better products, businesses, and technological alternatives arising from this opportunity and have not taken the next step of a full scale investment.
	Short	Since founding the new venture, you have spent ***one year*** exploring and searching for better products, businesses, and technological alternatives arising from this opportunity and have not taken the next step of a full scale investment.
Financial Market for New Ventures	**Attractive**	The current financial market for new ventures (e.g., venture capital and IPO market) is ***highly attractive***.
	Unattractive	The current financial market for new ventures (e.g., venture capital investment and IPO market) is ***highly unattractive***.
Threat of Imitation	**High**	A ***substantial*** amount of information about your business/ technological ideas and methods has been diffused throughout the industry so that (potential) competitors have ***access*** to them.
	Low	***Little*** amount of information about your business/technological ideas and methods has been diffused throughout the industry so that (potential) competitors ***do not*** have access to them.
Technological Uncertainty	**High**	The new venture has ***not yet established*** the technologies necessary to fully grasp the new opportunity.
	Low	The new venture has ***established*** the technologies necessary to fully grasp the new opportunity.
Customer Acceptance	**High**	Customers have ***substantial*** knowledge about the new venture's activities (products & services), and you are ***quite certain*** that there is a substantial future demand.
	Low	Customers have ***little*** knowledge about the new venture's activities (products & services), and you are ***uncertain*** that there is a substantial future demand.
Managerial Capability	**High**	You and your management team have ***considerable*** skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production.
	Low	You and your management team have ***limited*** skills, knowledge, and experience to be able to handle difficult and complex tasks in management and production.
Supporters' Commitment	**High**	Supporters (e.g., management team, investors, and suppliers) are ***highly*** supportive of the new venture.
	Low	Supporters (e.g., management team, investors, and suppliers) are ***marginally*** supportive of the new venture.

New Venture YYZ

1. Period of Exploration (Search)	**One** year
2. Financial Market for New Ventures	**Unattractive** financial market
3. Threat of Imitation	**High** threat of imitation
4. Technological Uncertainty	**Low** uncertainty
5. Customer Acceptance	**High** acceptance
6. Managerial Capability	**Low** capability
7. Supporters' Commitment	**High** commitment

Assessment:

Assume that you are the founder of the new venture being described above. As the founder, what would be your assessment today on the likelihood that you would commence the 'full scale' investment in this venture?

Please circle your response on the scale below.

Full scale investment very unlikely						***Full scale investment very likely***
1	**2**	**3**	**4**	**5**	**6**	**7**

- For the following venture profiles, the assessment questions have been removed.

New Venture QET

1. Period of Exploration (Search)	**One** year
2. Financial Market for New Ventures	**Unattractive** financial market
3. Threat of Imitation	**High** threat of imitation
4. Technological Uncertainty	**High** uncertainty
5. Customer Acceptance	**High** acceptance
6. Managerial Capability	**Low** capability
7. Supporters' Commitment	**High** commitment

New Venture ECW

1. Period of Exploration (Search)	**One** year
2. Financial Market for New Ventures	**Unattractive** financial market
3. Threat of Imitation	**High** threat of imitation
4. Technological Uncertainty	**Low** uncertainty
5. Customer Acceptance	**Low** acceptance
6. Managerial Capability	**High** capability
7. Supporters' Commitment	**High** commitment

New Venture SNQ

1. Period of Exploration (Search)	**Three** years
2. Financial Market for New Ventures	**Attractive** financial market
3. Threat of Imitation	**Low** threat of imitation
4. Technological Uncertainty	**High** uncertainty
5. Customer Acceptance	**High** acceptance
6. Managerial Capability	**Low** capability
7. Supporters' Commitment	**Low** commitment

New Venture RDO

1. Period of Exploration (Search)	**Three** years
2. Financial Market for New Ventures	**Unattractive** financial market
3. Threat of Imitation	**High** threat of imitation
4. Technological Uncertainty	**High** uncertainty
5. Customer Acceptance	**Low** acceptance
6. Managerial Capability	**High** capability
7. Supporters' Commitment	**Low** commitment

New Venture MIC

1. Period of Exploration (Search)	**Three** years
2. Financial Market for New Ventures	**Unattractive** financial market
3. Threat of Imitation	**Low** threat of imitation
4. Technological Uncertainty	**Low** uncertainty
5. Customer Acceptance	**High** acceptance
6. Managerial Capability	**High** capability
7. Supporters' Commitment	**High** commitment

New Venture GBY

1. Period of Exploration (Search)	**One** year
2. Financial Market for New Ventures	**Attractive** financial market
3. Threat of Imitation	**High** threat of imitation
4. Technological Uncertainty	**Low** uncertainty
5. Customer Acceptance	**High** acceptance
6. Managerial Capability	**High** capability
7. Supporters' Commitment	**Low** commitment

New Venture ALX

1. Period of Exploration (Search)	**Three** years
2. Financial Market for New Ventures	**Attractive** financial market
3. Threat of Imitation	**Low** threat of imitation
4. Technological Uncertainty	**Low** uncertainty
5. Customer Acceptance	**Low** acceptance
6. Managerial Capability	**High** capability
7. Supporters' Commitment	**Low** commitment

New Venture TFG

1. Period of Exploration (Search)	**Three** years
2. Financial Market for New Ventures	**Unattractive** financial market
3. Threat of Imitation	**High** threat of imitation
4. Technological Uncertainty	**Low** uncertainty
5. Customer Acceptance	**High** acceptance
6. Managerial Capability	**Low** capability
7. Supporters' Commitment	**Low** commitment

New Venture VKL

1. Period of Exploration (Search)	**One** year
2. Financial Market for New Ventures	**Attractive** financial market
3. Threat of Imitation	**Low** threat of imitation
4. Technological Uncertainty	**High** uncertainty
5. Customer Acceptance	**Low** acceptance
6. Managerial Capability	**High** capability
7. Supporters' Commitment	**High** commitment

New Venture XAB

1. Period of Exploration (Search)	**Three** years
2. Financial Market for New Ventures	**Attractive** financial market
3. Threat of Imitation	**High** threat of imitation
4. Technological Uncertainty	**High** uncertainty
5. Customer Acceptance	**High** acceptance
6. Managerial Capability	**High** capability
7. Supporters' Commitment	**High** commitment

New Venture PHK

1. Period of Exploration (Search)	**One** year
2. Financial Market for New Ventures	**Attractive** financial market
3. Threat of Imitation	**High** threat of imitation
4. Technological Uncertainty	**High** uncertainty
5. Customer Acceptance	**Low** acceptance
6. Managerial Capability	**Low** capability
7. Supporters' Commitment	**Low** commitment

New Venture YPA

1. Period of Exploration (Search)	**One** year
2. Financial Market for New Ventures	**Unattractive** financial market
3. Threat of Imitation	**Low** threat of imitation
4. Technological Uncertainty	**Low** uncertainty
5. Customer Acceptance	**Low** acceptance
6. Managerial Capability	**Low** capability
7. Supporters' Commitment	**Low** commitment

New Venture DGW

1. Period of Exploration (Search)	**Three** years
2. Financial Market for New Ventures	**Attractive** financial market
3. Threat of Imitation	**High** threat of imitation
4. Technological Uncertainty	**Low** uncertainty
5. Customer Acceptance	**Low** acceptance
6. Managerial Capability	**Low** capability
7. Supporters' Commitment	**High** commitment

New Venture KJD

1. Period of Exploration (Search)	**One** year
2. Financial Market for New Ventures	**Unattractive** financial market
3. Threat of Imitation	**Low** threat of imitation
4. Technological Uncertainty	**High** uncertainty
5. Customer Acceptance	**High** acceptance
6. Managerial Capability	**High** capability
7. Supporters' Commitment	**Low** commitment

New Venture BOT

1. Period of Exploration (Search)	**Three** years
2. Financial Market for New Ventures	**Unattractive** financial market
3. Threat of Imitation	**Low** threat of imitation
4. Technological Uncertainty	**High** uncertainty
5. Customer Acceptance	**Low** acceptance
6. Managerial Capability	**Low** capability
7. Supporters' Commitment	**High** commitment

New Venture ZMF

1. Period of Exploration (Search)	**One** year
2. Financial Market for New Ventures	**Attractive** financial market
3. Threat of Imitation	**Low** threat of imitation
4. Technological Uncertainty	**Low** uncertainty
5. Customer Acceptance	**High** acceptance
6. Managerial Capability	**Low** capability
7. Supporters' Commitment	**High** commitment

New Venture VHQ

1. Technological Uncertainty	**High** uncertainty
2. Customer Acceptance	**Low** acceptance
3. Supporters' Commitment	**Low** capability
4. Managerial Capability	**Low** commitment
5. Threat of Imitation	**High** threat of imitation
6. Financial Market for New Ventures	**Attractive** financial market
7. Period of Exploration (Search)	**One** year

New Venture RCP

1. Technological Uncertainty	**Low** uncertainty
2. Customer Acceptance	**Low** acceptance
3. Supporters' Commitment	**High** commitment
4. Managerial Capability	**High** capability
5. Threat of Imitation	**High** threat of imitation
6. Financial Market for New Ventures	**Unattractive** financial market
7. Period of Exploration (Search)	**One** year

New Venture DFR

1. Period of Exploration (Search)	**Low** uncertainty
2. Financial Market for New Ventures	**High** acceptance
3. Threat of Imitation	**Low** capability
4. Technological Uncertainty	**Low** commitment
5. Customer Acceptance	**High** threat of imitation
6. Managerial Capability	**Unattractive** financial market

New Venture ZOH

1. Technological Uncertainty	**High** uncertainty
2. Customer Acceptance	**Low** acceptance
3. Managerial Capability	**Low** capability
4. Supporters' Commitment	**High** commitment
5. Threat of Imitation	**Low** threat of imitation
6. Financial Market for New Ventures	**Unattractive** financial market
7. Period of Exploration (Search)	**Three** years

New Venture XIK

1. Technological Uncertainty	**Low** uncertainty
2. Customer Acceptance	**High** acceptance
3. Managerial Capability	**High** capability
4. Supporters' Commitment	**High** commitment
5. Threat of Imitation	**Low** threat of imitation
6. Financial Market for New Ventures	**Unattractive** financial market
7. Period of Exploration (Search)	**Three** years

New Venture ONX

1. Technological Uncertainty	**High** uncertainty
2. Customer Acceptance	**High** acceptance
3. Managerial Capability	**Low** capability
4. Supporters' Commitment	**Low** commitment
5. Threat of Imitation	**Low** threat of imitation
6. Financial Market for New Ventures	**Attractive** financial market
7. Period of Exploration (Search)	**Three** years

New Venture LDY

1. Technological Uncertainty	**High** uncertainty
2. Customer Acceptance	**Low** acceptance
3. Managerial Capability	**High** capability
4. Supporters' Commitment	**Low** commitment
5. Threat of Imitation	**High** threat of imitation
6. Financial Market for New Ventures	**Unattractive** financial market
7. Period of Exploration (Search)	**Three** years

New Venture QLZ

1. Technological Uncertainty	**Low** uncertainty
2. Customer Acceptance	**Low** acceptance
3. Managerial Capability	**High** capability
4. Supporters' Commitment	**Low** commitment
5. Threat of Imitation	**Low** threat of imitation
6. Financial Market for New Ventures	**Attractive** financial market
7. Period of Exploration (Search)	**Three** years

New Venture TGW

1. Technological Uncertainty	**Low** uncertainty
2. Customer Acceptance	**Low** acceptance
3. Managerial Capability	**Low** capability
4. Supporters' Commitment	**High** commitment
5. Threat of Imitation	**High** threat of imitation
6. Financial Market for New Ventures	**Attractive** financial market
7. Period of Exploration (Search)	**Three** years

New Venture PBG

1. Technological Uncertainty	**Low** uncertainty
2. Customer Acceptance	**High** acceptance
3. Managerial Capability	**High** capability
4. Supporters' Commitment	**Low** commitment
5. Threat of Imitation	**High** threat of imitation
6. Financial Market for New Ventures	**Attractive** financial market
7. Period of Exploration (Search)	**One** year

New Venture MJN

1. Technological Uncertainty	**High** uncertainty
2. Customer Acceptance	**High** acceptance
3. Managerial Capability	**Low** commitment
4. Supporters' Commitment	**High** capability
5. Threat of Imitation	**Low** threat of imitation
6. Financial Market for New Ventures	**Unattractive** financial market
7. Period of Exploration (Search)	**One** year

New Venture WMG

1. Technological Uncertainty	**Low** uncertainty
2. Customer Acceptance	**High** acceptance
3. Supporters' Commitment	**Low** capability
4. Managerial Capability	**High** commitment
5. Threat of Imitation	**Low** threat of imitation
6. Financial Market for New Ventures	**Attractive** financial market
7. Period of Exploration (Search)	**One** year

New Venture BEV

1. Technological Uncertainty	**High** uncertainty
2. Customer Acceptance	**High** acceptance
3. Managerial Capability	**Low** capability
4. Supporters' Commitment	**High** commitment
5. Threat of Imitation	**High** threat of imitation
6. Financial Market for New Ventures	**Unattractive** financial market
7. Period of Exploration (Search)	**One** year

New Venture SKL

1. Technological Uncertainty	**High** uncertainty
2. Customer Acceptance	**Low** acceptance
3. Managerial Capability	**High** capability
4. Supporters' Commitment	**High** commitment
5. Threat of Imitation	**Low** threat of imitation
6. Financial Market for New Ventures	**Attractive** financial market
7. Period of Exploration (Search)	**One** year

New Venture UAQ

1. Technological Uncertainty	**High** uncertainty
2. Customer Acceptance	**High** acceptance
3. Managerial Capability	**High** capability
4. Supporters' Commitment	**High** commitment
5. Threat of Imitation	**High** threat of imitation
6. Financial Market for New Ventures	**Attractive** financial market
7. Period of Exploration (Search)	**Three** years

New Venture VPT

1. Technological Uncertainty	**Low** uncertainty
2. Customer Acceptance	**Low** acceptance
3. Managerial Capability	**Low** capability
4. Supporters' Commitment	**Low** commitment
5. Threat of Imitation	**Low** threat of imitation
6. Financial Market for New Ventures	**Unattractive** financial market
7. Period of Exploration (Search)	**One** year

Instruction: Now we would like you to rate the importance of the various criteria when determining your decision on the likelihood of the 'full scale' investment.

1. Period of Exploration (Search)	Very Unimportant 1 2 3 4 5 6 7 Very Important
2. Financial Market for New Ventures	Very Unimportant 1 2 3 4 5 6 7 Very Important
3. Threat of Imitation	Very Unimportant 1 2 3 4 5 6 7 Very Important
4. Technological Uncertainty	Very Unimportant 1 2 3 4 5 6 7 Very Important
5. Customer Acceptance	Very Unimportant 1 2 3 4 5 6 7 Very Important
6. Managerial Capability	Very Unimportant 1 2 3 4 5 6 7 Very Important
7. Supporters' Commitment	Very Unimportant 1 2 3 4 5 6 7 Very Important

Instruction: We would like you to rate what would be your assessment on the following statements. Please circle your response on the scale below.

1. The most important goal in starting a new venture was to "let me do the kind of work I wanted to do."	Strongly disagree 1 2 3 4 5 6 7 Strongly agree
2. The most important goal in starting a new venture is to "build a successful organization."	Strongly disagree 1 2 3 4 5 6 7 Strongly agree
3. The most important goal in starting a new venture is to "avoid working for others."	Strongly disagree 1 2 3 4 5 6 7 Strongly agree
4. I am proud to tell others that I am a (co-) founder of a new venture.	Strongly disagree 1 2 3 4 5 6 7 Strongly agree
5. I talk up this entrepreneurial career to my friends as a great career.	Strongly disagree 1 2 3 4 5 6 7 Strongly agree
6. My private views about my venture are different than those I express publicly.	Strongly disagree 1 2 3 4 5 6 7 Strongly agree
7. How much work I put into a new venture is directly linked to how much I am rewarded.	Strongly disagree 1 2 3 4 5 6 7 Strongly agree
8. The most important goal in starting a new venture is to "make more money than I would have made otherwise"	Strongly disagree 1 2 3 4 5 6 7 Strongly agree
9. Unless I'm rewarded for it in some way, I see no reason to expend extra effort for my venture.	Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Please respond to the questions below. Please remember that all responses are anonymous and confidential.

Personal History:

1. Your age in years: ( )
2. Your sex: Female ( ) Male ( )
3. Highest level of education:

a. High School ( ) b. Some College ( ) c. Bachelor's Degree ( )
d. Master's Degree ( ) e. Ph.D. Degree ( ) f. Other ( )

4. Education type (Check as many as possible)

a. Business ( ) b. Engineering ( ) c. Liberal Arts ( )
d. Science ( ) e. Other (explain) ( )

5. Number of years working for current company: ( ) years
6. Total number of years employed, all employers: ( ) years
7. Total number of years employed in business (for-profit): ( ) years
8. Have you been involved in the start-up of a business? If so, how many? ( ) start-up(s)

Background of Your Company:

8. Number of employees in your company: ( ) employees
9. Number of co-founders for the current company: ( ) co-founders
10. Development stage of your company (select one):

- Start-up ( )
- Early Growth ( )
- Expansion ( )
- Maturity ( )
- Decline ( )

11. Founding year of the current company: ( )
12. Your company's industry (select one):

- Computer ( )
- Telecommunication ( )
- Internet ( )
- Pharmaceutical ( )
- Medical equipment ( )
- Other (specify) _____

6. Sales in recent years: 1999: $( )M, 1998: $( )M, 1997: $( )M
7. Average sales growth in recent three years: ( )%
8. Are you working full-time for this company?

Yes ( ) No ( ) If no, what is your full-time occupation?_____

Thank you for participating in the entrepreneur's decision survey!!

If you would like to make some comments and/or receive the results of this research, please use the following page.

Comments:

Name, Mailing & Email Addresses:

APPENDIX D: E-MAIL/PHONE SCRIPTS AND COVER LETTER

* Phone conversations were based on the corresponding email script.

[Email/Phone Script for the Initial Contact]

Dear _____,

I am pleased to contact you.

I am currently conducting a nationwide survey, supported by the Coleman Foundation, about entrepreneurs' decision making on business growth, I believe your experience will improve our understanding of entrepreneurial decision making.

There are no right and wrong responses and it does not require actual data about your company. The survey asks entrepreneurs to assess (mark) the likelihood of commencing full scale operation (investment) in hypothetical new ventures.

I believe the survey will provide an unique experience for you to exercise an important strategic decision and understand how you make the decision. I will provide you with the results of this research, with practical implications.

Your participation is of enormous value and will help entrepreneurs gain greater insight into their own decision making and in so doing improve their chances of success. It will take 30 minutes to complete.

I would like to know if you can participate in this survey. I sincerely expect your positive response. If you have any questions, please let me know. Thanks a lot for your support in advance!

Best regards,
Young

Young Rok Choi
Doctoral Candidate in Entrepreneurship & Strategy
Lally School of Mgt & Tech
Rensselaer Polytechnic Institute
Troy, NY 12180
Phone: 518-276-5659
e-mail: choiy3@rpi.edu
Home page: http://www.rpi.edu/~choiy3/index.htm

[Email/Phone Script for the Second Contact]

Dear _____,

I am pleased to contact you again regarding our entrepreneurship research.

I read stories about your entrepreneurial experience and [your venture]. I believe your experience will improve our understanding of entrepreneurial decision making.

As I introduced in the previous email, I am conducting a national study, which is supported by a leading entrepreneurship foundation, the Coleman Foundation. The purpose of this research is to better understand the entrepreneur's decision making strategy on business growth. It does not need company information or data at all. It will take 30 minutes to complete.

Your participation and your precious time invested in this research will also contribute to the furtherance of entrepreneurship. I will provide participating entrepreneurs valuable implications from this study.

I thank you for your time and look forward to your participation in this important entrepreneurship research.

Sincerely,
Young

Young Rok Choi
Doctoral Candidate in Entrepreneurship & Strategy
Lally School of Mgt & Tech
Rensselaer Polytechnic Institute
Troy, NY 12180
Phone: 518-276-5659
e-mail: choiy3@rpi.edu
Home page: http://www.rpi.edu/~choiy3/index.htm

[Email/Phone Script for Reminder]

Dear _____,

This is just to remind you that I sent you the survey on May 14th. I wanted to know whether or not you received the survey questionnaire.

Since I am working on this research under time pressure, I sincerely hope to receive your valuable response soon, hopefully during this week.

If you already mailed it, I greatly appreciate your support. You will receive a customized research report of this research through email by the end of June.

Thanks a lot for your participation while you are busy!

Best regards,
Young

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[Cover Letter]

May 5, 2001

[Mr./Ms. Entrepreneur]
[President, CEO, or Vice President]
[New venture]
[Address]

Dear _____:

I am are pleased to mail you the survey of our research on the entrepreneur's decision making. Your participation is of enormous value and will help entrepreneurs gain greater insight into their own decision making and in doing so improve their chances of success.

I would like to mention that although this survey includes many pages (it looks thick), your assessment task is the same to all venture profiles so you will complete it within 30 minutes as I promised. I appreciate your valuable time invested in this survey.

I have enclosed a postage paid return envelop for your convenience. I thank you for your time and look forward to receiving the filled-in questionnaire soon.

Sincerely,

Young Rok Choi
Lally School of Management & Technology
Rensselaer Polytechnic Institute

APPENDIX E: FRENQUENCIES OF INDIVIDUAL AND FIRM LEVEL CHARACTERISTICS

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19.00	1	1.8	1.8	1.8
	20.00	1	1.8	1.8	3.6
	22.00	4	7.3	7.3	10.9
	25.00	1	1.8	1.8	12.7
	27.00	2	3.6	3.6	16.4
	30.00	1	1.8	1.8	18.2
	31.00	4	7.3	7.3	25.5
	32.00	3	5.5	5.5	30.9
	33.00	1	1.8	1.8	32.7
	34.00	1	1.8	1.8	34.5
	35.00	2	3.6	3.6	38.2
	37.00	2	3.6	3.6	41.8
	38.00	2	3.6	3.6	45.5
	39.00	2	3.6	3.6	49.1
	41.00	1	1.8	1.8	50.9
	42.00	2	3.6	3.6	54.5
	44.00	3	5.5	5.5	60.0
	45.00	1	1.8	1.8	61.8
	46.00	2	3.6	3.6	65.5
	47.00	1	1.8	1.8	67.3
	49.00	2	3.6	3.6	70.9
	51.00	2	3.6	3.6	74.5
	52.00	3	5.5	5.5	80.0
	54.00	2	3.6	3.6	83.6
	57.00	1	1.8	1.8	85.5
	58.00	2	3.6	3.6	89.1
	59.00	1	1.8	1.8	90.9
	61.00	2	3.6	3.6	94.5
	62.00	2	3.6	3.6	98.2
	75.00	1	1.8	1.8	100.0
	Total	55	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	6	10.9	10.9	10.9
	1.00	49	89.1	89.1	100.0
	Total	55	100.0	100.0	

Note: Gender: 0=Female, 1=Male

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	1.8	1.8	1.8
	2.00	5	9.1	9.1	10.9
	3.00	12	21.8	21.8	32.7
	4.00	21	38.2	38.2	70.9
	5.00	16	29.1	29.1	100.0
	Total	55	100.0	100.0	

Note: Education Level: 1=High School, 2=Some College, 3=Bachelor's, 4=Master's, 5=Ph.D.

Education Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	15	27.3	27.3	27.3
	2.00	19	34.5	34.5	61.8
	3.00	9	16.4	16.4	78.2
	4.00	11	20.0	20.0	98.2
	5.00	1	1.8	1.8	100.0
	Total	55	100.0	100.0	

Note: Education Type: 1=Business, 2=Engineering, 3=Liberal Arts, 4=Science

Year with the Current Company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.50	1	1.8	1.9	1.9
	1.00	9	16.4	17.0	18.9
	1.50	5	9.1	9.4	28.3
	2.00	5	9.1	9.4	37.7
	2.50	3	5.5	5.7	43.4
	3.00	9	16.4	17.0	60.4
	4.00	5	9.1	9.4	69.8
	5.00	2	3.6	3.8	73.6
	6.00	2	3.6	3.8	77.4
	7.00	1	1.8	1.9	79.2
	8.00	2	3.6	3.8	83.0
	10.00	2	3.6	3.8	86.8
	11.00	1	1.8	1.9	88.7
	12.00	1	1.8	1.9	90.6
	15.00	2	3.6	3.8	94.3
	18.00	2	3.6	3.8	98.1
	21.00	1	1.8	1.9	100.0
	Total	53	96.4	100.0	
Missing	9999.00	2	3.6		
Total		55	100.0		

Total Employment (Year)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	3.6	3.8	3.8
	1.50	1	1.8	1.9	5.7
	5.00	4	7.3	7.5	13.2
	6.00	3	5.5	5.7	18.9
	8.00	1	1.8	1.9	20.8
	9.00	1	1.8	1.9	22.6
	10.00	3	5.5	5.7	28.3
	11.00	2	3.6	3.8	32.1
	13.00	1	1.8	1.9	34.0
	14.00	1	1.8	1.9	35.8
	15.00	5	9.1	9.4	45.3
	16.00	1	1.8	1.9	47.2
	17.00	2	3.6	3.8	50.9
	18.00	1	1.8	1.9	52.8
	19.00	1	1.8	1.9	54.7
	20.00	3	5.5	5.7	60.4
	22.00	1	1.8	1.9	62.3
	23.00	1	1.8	1.9	64.2
	24.00	1	1.8	1.9	66.0
	25.00	2	3.6	3.8	69.8
	26.00	1	1.8	1.9	71.7
	27.00	1	1.8	1.9	73.6
	30.00	3	5.5	5.7	79.2
	32.00	1	1.8	1.9	81.1
	33.00	1	1.8	1.9	83.0
	34.00	1	1.8	1.9	84.9
	35.00	1	1.8	1.9	86.8
	36.00	1	1.8	1.9	88.7
	39.00	1	1.8	1.9	90.6
	40.00	2	3.6	3.8	94.3
	42.00	2	3.6	3.8	98.1
	55.00	1	1.8	1.9	100.0
	Total	53	96.4	100.0	
Missing	9999.00	2	3.6		
Total		55	100.0		

Total Employment in Business (Year)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	1	1.8	2.0	2.0
	1.50	2	3.6	3.9	5.9
	2.50	1	1.8	2.0	7.8
	3.00	5	9.1	9.8	17.6
	4.00	1	1.8	2.0	19.6
	5.00	5	9.1	9.8	29.4
	6.00	1	1.8	2.0	31.4
	7.00	1	1.8	2.0	33.3
	7.50	1	1.8	2.0	35.3
	8.00	1	1.8	2.0	37.3
	9.00	2	3.6	3.9	41.2
	10.00	1	1.8	2.0	43.1
	11.00	1	1.8	2.0	45.1
	13.00	1	1.8	2.0	47.1
	14.00	1	1.8	2.0	49.0
	15.00	2	3.6	3.9	52.9
	16.00	1	1.8	2.0	54.9
	17.00	1	1.8	2.0	56.9
	18.00	1	1.8	2.0	58.8
	19.00	2	3.6	3.9	62.7
	20.00	3	5.5	5.9	68.6
	23.00	1	1.8	2.0	70.6
	25.00	2	3.6	3.9	74.5
	26.00	1	1.8	2.0	76.5
	27.00	1	1.8	2.0	78.4
	30.00	3	5.5	5.9	84.3
	31.00	1	1.8	2.0	86.3
	33.00	1	1.8	2.0	88.2
	34.00	2	3.6	3.9	92.2
	35.00	1	1.8	2.0	94.1
	37.00	1	1.8	2.0	96.1
	40.00	2	3.6	3.9	100.0
	Total	51	92.7	100.0	
Missing	9999.00	4	7.3		
Total		55	100.0		

# of Start-Ups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	25	45.5	49.0	49.0
	2.00	11	20.0	21.6	70.6
	3.00	6	10.9	11.8	82.4
	4.00	4	7.3	7.8	90.2
	5.00	2	3.6	3.9	94.1
	6.00	1	1.8	2.0	96.1
	7.00	1	1.8	2.0	98.0
	12.00	1	1.8	2.0	100.0
	Total	51	92.7	100.0	
Missing	9999.00	4	7.3		
Total		55	100.0		

# of Employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2	3.6	3.8	3.8
	1.00	1	1.8	1.9	5.8
	2.00	3	5.5	5.8	11.5
	3.00	2	3.6	3.8	15.4
	4.00	5	9.1	9.6	25.0
	5.00	9	16.4	17.3	42.3
	6.00	6	10.9	11.5	53.8
	7.00	1	1.8	1.9	55.8
	8.00	4	7.3	7.7	63.5
	9.00	3	5.5	5.8	69.2
	10.00	2	3.6	3.8	73.1
	11.00	2	3.6	3.8	76.9
	13.00	1	1.8	1.9	78.8
	15.00	1	1.8	1.9	80.8
	16.00	1	1.8	1.9	82.7
	20.00	1	1.8	1.9	84.6
	25.00	1	1.8	1.9	86.5
	35.00	1	1.8	1.9	88.5
	40.00	1	1.8	1.9	90.4
	42.00	1	1.8	1.9	92.3
	50.00	2	3.6	3.8	96.2
	60.00	1	1.8	1.9	98.1
	85.00	1	1.8	1.9	100.0
	Total	52	94.5	100.0	
Missing	9999.00	3	5.5		
Total		55	100.0		

# of Founders

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	4	7.3	7.8	7.8
	1.00	11	20.0	21.6	29.4
	2.00	25	45.5	49.0	78.4
	3.00	6	10.9	11.8	90.2
	4.00	5	9.1	9.8	100.0
	Total	51	92.7	100.0	
Missing	9999.00	4	7.3		
Total		55	100.0		

Development Stage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	17	30.9	32.7	32.7
	2.00	26	47.3	50.0	82.7
	3.00	8	14.5	15.4	98.1
	4.00	1	1.8	1.9	100.0
	Total	52	94.5	100.0	
Missing	9999.00	3	5.5		
Total		55	100.0		

Note: 1=Start-up, 2=Early Growth, 3=Expansion, 4=Maturity, 5=Decline

Founding Year

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1983.00	1	1.8	2.0	2.0
	1988.00	1	1.8	2.0	4.1
	1991.00	1	1.8	2.0	6.1
	1992.00	2	3.6	4.1	10.2
	1994.00	2	3.6	4.1	14.3
	1995.00	2	3.6	4.1	18.4
	1996.00	2	3.6	4.1	22.4
	1997.00	9	16.4	18.4	40.8
	1998.00	6	10.9	12.2	53.1
	1999.00	15	27.3	30.6	83.7
	2000.00	7	12.7	14.3	98.0
	2001.00	1	1.8	2.0	100.0
	Total	49	89.1	100.0	
Missing	9999.00	6	10.9		
Total		55	100.0		

Industry Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	18	32.7	34.6	34.6
	2.00	2	3.6	3.8	38.5
	3.00	12	21.8	23.1	61.5
	4.00	5	9.1	9.6	71.2
	5.00	4	7.3	7.7	78.8
	6.00	11	20.0	21.2	100.0
	Total	52	94.5	100.0	
Missing	9999.00	3	5.5		
Total		55	100.0		

Note: 1=Computer, 2=Telecommunication, 3=Internet, 4=Bio/Pharmaceutical, 5=Medical Equipment, 6= Engineering (Other).

Sales (Million $)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	5.5	11.1	11.1
	.05	1	1.8	3.7	14.8
	.08	1	1.8	3.7	18.5
	.10	4	7.3	14.8	33.3
	.15	2	3.6	7.4	40.7
	.25	1	1.8	3.7	44.4
	.30	3	5.5	11.1	55.6
	.45	1	1.8	3.7	59.3
	.58	1	1.8	3.7	63.0
	.80	1	1.8	3.7	66.7
	1.00	1	1.8	3.7	70.4
	1.55	1	1.8	3.7	74.1
	1.60	1	1.8	3.7	77.8
	2.00	1	1.8	3.7	81.5
	2.40	1	1.8	3.7	85.2
	2.50	1	1.8	3.7	88.9
	3.10	1	1.8	3.7	92.6
	4.50	1	1.8	3.7	96.3
	250.00	1	1.8	3.7	100.0
	Total	27	49.1	100.0	
Missing	9999.00	28	50.9		
Total		55	100.0		

Sales Growth (%)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	5.5	12.0	12.0
	10.00	1	1.8	4.0	16.0
	11.00	1	1.8	4.0	20.0
	15.00	1	1.8	4.0	24.0
	16.00	1	1.8	4.0	28.0
	20.00	1	1.8	4.0	32.0
	25.00	1	1.8	4.0	36.0
	30.00	2	3.6	8.0	44.0
	35.00	1	1.8	4.0	48.0
	40.00	1	1.8	4.0	52.0
	48.00	1	1.8	4.0	56.0
	50.00	3	5.5	12.0	68.0
	55.00	1	1.8	4.0	72.0
	86.00	1	1.8	4.0	76.0
	100.00	2	3.6	8.0	84.0
	200.00	1	1.8	4.0	88.0
	300.00	1	1.8	4.0	92.0
	400.00	1	1.8	4.0	96.0
	700.00	1	1.8	4.0	100.0
	Total	25	45.5	100.0	
Missing	9999.00	30	54.5		
Total		55	100.0		

Type of Employment for Current Company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	44	80.0	84.6	84.6
	1.00	8	14.5	15.4	100.0
	Total	52	94.5	100.0	
Missing	9999.00	3	5.5		
Total		55	100.0		

Note: 0=Full-time, 1=Part-time

APPENDIX F: REGRESSION COEFFICIENTS

ID	Cons.	PE	FM	TI	TU	CA	MC	SC	TI*PE	TI*FM	TI*TU	TI*CA	TI*MC	TI*SC
1	1.250	.000	-1.250	-.562	-1.000	2.750	1.750	.500	-.875	2.875	-.125	-.875	.375	-1.125
2	1.938	.875	1.125	-.813	-1.125	1.125	1.125	.875	.125	-.125	-.125	.125	-.375	.125
3	2.063	-.125	-.125	.125	-.625	1.875	1.125	1.625	.250	.750	-.750	-.750	-.500	-1.000
4	1.125	.250	.250	.625	-1.750	2.250	2.250	1.250	-.250	.000	.750	.000	-1.000	-.750
5	1.438	-.125	-.375	-.563	.375	1.625	1.625	2.375	.625	-.125	.375	-.875	-.375	.625
6	2.313	.625	-.125	.500	-1.125	2.625	1.375	.375	-1.250	-.500	-.500	-1.250	-.500	1.500
7	2.500	-.750	1.250	-1.563	-1.250	1.750	.000	1.000	.375	.125	.375	-.875	.875	-.875
8	2.063	1.125	1.125	-.937	-1.125	1.875	.625	.375	.125	-.125	-.125	-.875	.375	-.125
9	1.063	2.125	.375	-1.375	-1.625	.625	2.375	-.125	.000	.750	1.750	.000	-.750	.750
10	1.188	.375	2.875	-.500	-.375	1.125	1.875	-.375	.250	-1.000	.250	.000	.500	.750
11	1.063	.375	-1.375	-1.938	-.625	3.625	.875	1.125	.125	2.625	1.125	-1.375	.625	-.375
12	1.688	.625	1.125	.062	-.375	1.125	2.875	.875	.125	-.625	-.625	-.875	-.125	-.125
13	3.563	.625	-.125	-.875	-.125	1.125	.375	1.375	-.750	.250	-.500	.500	.500	-.750
14	2.875	.250	1.000	1.000	.000	.750	.500	.000	-1.250	-.750	-.750	-.250	.500	.000
15	.938	.625	3.125	-1.688	-.875	2.125	.375	.375	-.375	-.125	.375	-.375	1.375	.875
16	.938	.125	.625	.188	-.625	4.375	.375	1.125	.125	-.125	-.125	-.375	.125	-1.375
17	.813	.125	.625	-1.375	.125	2.125	2.625	.625	-.250	1.500	.000	-.250	.250	-.250
18	4.188	.125	-.125	-1.188	-1.625	.125	1.625	.625	.375	.125	-.375	.375	-.125	-.125
19	2.875	-.250	.250	-1.875	-.250	2.250	.250	.750	1.000	.500	.250	-.750	.250	.000
20	3.188	.875	.625	-.687	-1.125	1.625	.625	.875	-1.125	.125	-.625	-.375	-.125	-.875
21	1.500	1.000	.500	-1.375	-1.750	.750	1.000	.750	-.750	.250	1.750	-.250	-.250	.250
22	1.375	.250	-.500	-.563	.000	1.750	2.500	.000	-.125	1.375	.375	-.125	-.375	.125
23	2.000	1.000	1.000	-.750	-1.000	1.000	1.000	1.000	.000	-.250	.000	-.250	.250	.000
24	.750	.500	-.500	.312	-2.500	2.500	.500	2.500	-.625	.625	2.375	-2.375	-.375	-2.625
25	1.875	.000	1.000	-.625	-1.250	1.750	.750	1.000	.000	.500	.500	-1.000	-.250	-.250
26	2.000	.500	.000	-.813	-1.000	1.500	1.500	1.500	-.125	.375	.375	-.125	-.375	-.375
27	.875	.750	1.000	-.688	-1.500	2.250	1.000	1.500	-.375	-.125	1.375	-.875	.125	-.875
28	4.375	.000	1.000	-2.938	-.500	1.000	1.250	.250	.625	.125	-.125	-.125	.375	.125

ID	Cons.	PE	FM	TI	TU	CA	MC	SC	TI*PE	TI*FM	TI*TU	TI*CA	TI*MC	TI*SC
29	1.813	.875	.625	-1.125	-.875	2.375	1.375	.875	-.500	.500	.250	.250	-.500	-.250
30	1.750	-.500	.000	-1.313	-.500	1.500	1.000	1.000	1.375	.375	.625	.125	.125	-.625
31	1.063	1.125	.875	-1.250	-1.375	1.375	1.375	1.125	-.750	.250	1.250	.250	.250	-.250
32	1.500	.750	.250	-1.313	-1.500	1.000	2.500	1.250	-.375	.625	1.375	-.125	-.875	-.625
33	1.500	.250	.000	-.688	-2.250	2.500	.250	2.500	-.125	.625	1.875	-.375	.125	-1.625
34	2.063	.125	.875	-1.125	-.625	1.625	1.375	.875	.000	.000	.500	.000	.000	-1.000
35	1.188	-.375	1.375	.125	-.375	1.375	1.125	1.375	.250	.500	.250	-.500	-.250	-1.000
36	1.000	.000	2.000	.438	-.250	1.750	1.500	1.250	.625	-.375	.625	-1.375	.125	-.375
37	2.125	.250	.250	-1.875	-.750	2.250	.250	.750	.000	.750	.750	-.500	1.000	-.500
38	2.250	-2.500	2.250	-2.813	-.500	-.250	-.750	2.500	3.375	-1.375	1.125	.875	1.375	-1.625
39	.875	.250	.250	1.063	-.750	5.250	-.250	.750	-.125	.125	-.625	-1.375	.625	-2.125
40	2.000	.500	.000	-.688	-.750	2.750	.000	.750	-.375	.625	.875	-1.625	1.375	-.875
41	4.188	-1.875	.625	-2.375	-2.125	1.375	2.875	.625	.000	.500	.250	-.250	.000	-.750
42	2.000	.250	1.000	-.187	-.750	2.000	1.750	1.000	-.125	.125	-1.375	-.625	.125	-.375
43	1.125	.500	1.500	-.125	-.500	2.500	1.250	.250	.500	.500	-.500	-1.000	-.750	.750
44	3.625	-.750	1.000	-2.188	-.750	.500	.500	.750	1.125	-.125	.375	.625	.625	-.375
45	.938	1.125	-.125	-.375	-.625	.625	1.625	.625	-1.500	1.250	.000	.250	-.250	-.500
46	2.438	.875	1.625	-1.813	-1.375	.875	2.125	.625	-.375	-.625	.875	.125	-.875	.125
47	1.188	1.125	2.125	-1.000	-.125	1.375	.875	1.125	.000	.000	.250	-.250	-.250	.500
48	1.000	-.250	1.500	-1.375	-1.000	1.250	1.750	1.750	1.000	.000	1.250	-.250	.250	-1.500
49	2.000	.250	.000	-1.188	-.250	2.000	1.250	1.000	-.125	.125	.625	-1.125	-.375	-.375
50	1.500	.500	1.000	-.250	-.250	1.250	2.000	.750	-.500	-.500	.000	-.500	.500	.500
51	.625	.000	1.500	-.062	-.500	3.000	.250	1.750	-.125	-1.125	.625	-.375	.625	-.125
52	2.000	-.250	.000	-.313	-.750	1.500	1.250	1.000	.375	-.375	.375	-1.375	-.125	-.375
53	1.750	.250	-.250	-1.063	-1.250	3.250	1.000	1.000	-.125	.875	.875	-.125	-.375	-.375
54	1.875	.500	1.000	-1.063	-1.250	.750	1.250	.500	-.625	.625	.375	.625	-.125	-.375
55	3.125	.000	2.250	-2.375	-1.250	1.500	.500	.500	-.500	-.500	1.000	-.500	.250	-.250
Sum	102.3125	14.875	37.875	-47.1875	-47.875	96.625	64.125	52.375	-1.625	12.375	21.125	-23.375	3.625	-21.125
Mean	1.86	.27	.69	-.86	-.87	1.76	1.17	.95	-.03	.23	.38	-.43	.07	-.38

Note: PE: Period of Exploration; FM: Financial Market Attractiveness; TI: Threat of Imitation; TU: Technological Uncertainty; CA: Customer Acceptance; MC: Managerial Capability; SC: Supporters' Commitments