



**ADVANCES IN ENTREPRENEURSHIP, FIRM EMERGENCE
AND GROWTH
VOLUME 9**

**ENTREPRENEURSHIP: FRAMEWORKS AND
EMPIRICAL INVESTIGATIONS FROM
FORTHCOMING LEADERS OF
EUROPEAN RESEARCH**

**JOHAN WIKLUND
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Editors

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EUROPE AND ENTREPRENEURSHIP RESEARCH

Johan Wiklund, Dimo Dimov, Jerome Katz and
Dean Shepherd

The hallmark of the “European Approach to Entrepreneurship,” if there is such a thing, has been its diversity. European entrepreneurship research has been like Europe itself, a panoply of diverse ways of thinking, expressed in theories, methods, or research questions. Only when comparing European research to North American do observers find a semblance of commonality. For example, it appears that European researchers as a whole tend to use more fieldwork and qualitative analysis approaches than do their North American counterparts (e.g., Aldrich, 2000). However, this perhaps reflects a stronger academia-based and quantitative dominant research paradigm among North American researchers than among the diverse research traditions currently active in Europe.

There are many reasons for this European diversity. One certain source is cultural, as differences in national culture, values, and language get articulated in a variety of themes and ways of knowing that can dramatically vary from country to country. Culture also underpins institutional differences, with European governments and universities pursuing different, albeit nationally distinctive, approaches to promoting funding, and rewarding research and academic achievement.

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Amid these traditions of diversity runs a contrarian initiative; an initiative revolving around the globalization of business schools across the continent. Worldwide, there is a homogenization of business schools as they compete globally for students and placements for their graduates in global industrial organizations. The homogenization is evidenced by a focus on English as the standard language of instruction, and a focus on MBA program rankings, which in turn reinforces the primacy of English as the language of business. Many business schools are setting up campuses in other countries, although increasingly English is becoming the language of instruction on these new campuses. Consequently, prospective students are now faced with great study opportunities, but faculty are facing increased pressures to teach and publish in English.

Creating a norm of English-based instruction in business means in part that programs can be located nearly anywhere, and still utilize the same textbooks, cases, websites, magazines, and videos as do the top-rated schools in North America or Europe. As a result, new business schools and new foreign programs for existing business schools are emerging throughout the world. These offer a wealth of opportunity for quality instruction to students. But this also reinforces the primacy of English as the dominant language of business. The question is whether this primacy of language also reinforces the North American approach to business research, which would undermine the traditional diversity of European business research and theory.

Adding to this is the impact of rankings of business schools. As these rankings increasingly become a mechanism for helping students to select from a global deluge of business programs, their impact on business schools grows. All of the major rankings are published by magazines or organizations for whom English is the primary language, e.g., *Business Week*, *Financial Times*, *US News*, etc. These rankings are based on strict criteria for evaluating the quality of business schools, but even here the dominance of English-language approaches is evident. For example, in terms of research, publication in a limited number of scholarly journals is an important aspect of the school's research standing. In their ranking of business schools, the *Financial Times* includes publications in 40 selected journals – all published in English.

Abetting this trend, these rankings are increasingly used by European business schools in their internal evaluations. For example, some European business schools have started awarding cash bonuses for publications in the leading scholarly outlets, which are largely published in English. European governments are even beginning to use a similar approach in public universities to reward institutional performance. For example, Norway is

introducing a system where public university funding is based on research output, with an emphasis on international journal publication. Similarly, national standards for promotion to associate professor are being introduced in Belgium based on similar considerations.

There are two ways to look at the impacts of this homogenization process on the traditional diversity of European entrepreneurship research. In terms of problems, the works of psycholinguists from Noam Chomsky have told us how our ways of thinking are defined in part by our languages. When your language does not have a word for something or some process, it is very difficult to imagine or deal with it on a regular basis, making language a key component of organizational and national culture (Trice & Beyer, 1993), despite certain universals in human language (Chomsky, 1972, 2000).

Could the increased reliance on English as the language of instruction and publication in business education be seen as a threat to the historic diversity of European thought? Could an American have produced insights like those of Frenchman Michel Crozier in *The Bureaucratic Phenomenon* (Crozier, 1964), or in entrepreneurship produced insights like those of Italy's Giacomo Becattini (1987, 2004) around the creation of industrial districts and the Florence School of economic development? If the linguistic imperative is believed, there is a possibility that language could influence the types of creativity evidenced. The problem is one about which many of the North American editorial boards and sponsoring organizations have expressed concerns. As a result, most of the major publications have made efforts to globalize their editorial boards, although the degree of diversity achieved as well as the evaluation of the overall effectiveness of this effort remains to be seen.

On the positive side, the global homogenization of business education and the increased use of English as the language of instruction and publication opens up great opportunities for young European academics. First, there is increased opportunity for collaborative research across national borders. As recently as 1996, Landström and Huse (1996) found few instances of collaboration between North American and European researchers, while Aldrich (2000) noted increased activity. Without any doubt, international collaboration has continued to increase substantially.

Second, there is now a much wider range of job opportunities and greater prospects for international mobility within Europe and to other continents. However, these opportunities that globalization open up also lead to increased competition for the individual academic. Therefore, it has become increasingly important for young European scholars to understand how the competitive landscape is changing.

In response to this in recent years a “new breed” of Europe-based entrepreneurship scholars has emerged. These are scholars who are moving the entrepreneurship field forward by conducting theory-driven empirical research of high quality and publishing – in English – in leading international scholarly journals. While outstanding European scholars have been active in the field for a long time, the “new breed” is currently advancing the field in terms of theory development and the publishing outlets chosen. It is to this “new breed” of European entrepreneurship researchers that this volume of *Advances in Entrepreneurship, Firm Emergence and Growth* turns.

In Chapter 2, Ucbasaran, Westhead, and Wright draw from the literatures on behavioral decision making and trauma to explore the effect of failure on overconfidence and persistence and in the context of habitual entrepreneurs. Contrary to expectations, experiencing failure does not diminish the entrepreneurs’ confidence or resolve to continue pursuing opportunities; it in fact boosts these further. Further, while the emotional costs of failure may be overbearing, a streak of successes can help one supplant them. These insights serve to sustain a very important conversation within entrepreneurship research.

In Chapter 3, Rauch and Frese recommend using meta-analysis as a tool for accumulating and appraising empirical evidence in the domain of entrepreneurship. As a statistical method to review existing empirical literature, this approach can be used to test and validate theories and thus provide evidence for strong practice recommendations. It also plays an important role in verifying the status of the theoretical concepts used in the entrepreneurship literature and is thus indispensable in advancing research. The authors use several meta-analyses of the personality approach to entrepreneurship to showcase the usefulness of this approach to the study of entrepreneurship. In contrast to many narrative reviews, these meta-analyses provide support for the contribution of the personality approach to understanding entrepreneurship.

In Chapter 4, Samuelsson investigates the evolution of venture opportunities from recognition on through the nascent venturing process. Using data from the Swedish panel study of business start-ups, he shows important systematic differences in the exploitation of innovative versus imitative venture opportunities. While the former relies on tacit and codified knowledge, emotional capital, and a growing instrumental social capital, the latter is driven by competitive awareness and a large and growing use of instrumental social capital. These insights and their discussed theoretical implication make an important contribution to the development of entrepreneurship theory.

In Chapter 5, Dodd, Jack, and Anderson add to our qualitative understanding of adaptation and change within entrepreneurial networks. They draw insights from the findings of a three-stage longitudinal research project that combined cross-sectional qualitative and quantitative data collection. They not only reinforce the relevance of networking for entrepreneurship, but also illustrate how network contacts and the actual structures of networks changed over time. Their study also demonstrates that the network becomes the mechanism for coping and dealing with change. These insights help us conceive the role of the networked entrepreneur within the wider business environment as the agent and catalyst of and for change.

In Chapter 6, Mark Freel contributes to our understanding of innovation by exploring its antecedents in the particular context of knowledge-intensive business services. Using a more comprehensive and balanced sample, he shows that the innovation process within such service firms bears much more resemblance to the one of manufacturing firms than previously anticipated. By highlighting the inherent diversity of service firms, this work serves to dispel the myths of such firms as innovation laggards.

For Chapter 7, McKelvie, Wiklund, and Davidsson use a resource-based perspective to explain the different patterns in organic versus acquired growth of small and large firms. They suggest that organic and acquisition growth are different processes requiring different explanations in terms of the firms' resource endowments and usages. Entrepreneurial resources, reflected in the firm's entrepreneurial orientation, are important to organic growth, whereas the size of the firm's resource pool, as seen by financial capital and managers, is important to acquisition growth. This perspective brings important nuances to our understanding of firm growth.

In Chapter 8, Heirman and Clarysse bring new insights in the drivers of early growth of research-based start-ups (RBSUs). Using rich qualitative data on the 20 fastest growing RBSUs in their sample, they highlight the importance of the firms' ability to raise sufficient amounts of capital for employment and revenue growth in the first years. While most RBSUs start with purely technical teams, experience in R&D has no significant effect on growth; rather, it is the commercial experience and market knowledge of such teams that drives growth. Further, the study shows that the patterns of growth have many diverging aspects: while internationally oriented start-ups grow faster in terms of revenues and total assets, their employment growth is slower compared to firms with a local orientation.

In Chapter 9, Salvato, Lassini, and Wiklund explore the patterns of acquisition growth by small and medium-sized firms, and the concurrent development of acquisition and integration capabilities. In their longitudinal

comparative case studies of 18 Italian small and medium-sized enterprises, they focus in particular on the initial decision to pursue growth by acquisitions, on the creation and storage of acquisition knowledge, and on subsequent use of accrued capabilities, over time. The key insights emerging from their study focus on acquisition and integration as value-creating acts, their critical dependence on the actor's context and previous experience, and their predication on the development, storage, and use of specific organizational capabilities.

Chapter 10 by Maula, Autio, and Murray takes us to the realm of corporate venture capital by contributing to our understanding of how corporate venture capital investors add value to their technology-based portfolio companies. The authors identify resource acquisition, knowledge acquisition, and endorsement as the primary mechanisms through which such value adding occurs. In addition, these mechanisms are affected by complementarities, social interaction, investor prominence, and the nature of the venture and the customers. The theoretical model is validated using structural equation modeling with data collected from CEOs of U.S. corporate venture capital financed technology-based new firms.

In Chapter 11, De Clercq, Sapienza, Sandberg, and Crijns address two key questions: (1) What factors affect entrepreneurs' propensity to undertake learning activities in the international market place? (2) How do entrepreneurs' learning activities (both internationally and domestically) affect their propensity to further commit themselves to international markets? These issues are examined by reporting the results from two studies based on data from Belgian firms that are active in the international arena. Study 1 examines factors related to firms' propensity to engage in learning activities in the international and domestic market place. Study 2 examines factors (including learning activities) related to firms' propensity, once internationalized, to further commit themselves to international markets.

Taken together, these 10 papers exemplify many of the characteristics of the "new breed" in European entrepreneurship research. They are empirical, but often combine surveys and secondary data along with interview and observation. Arguably, the chapters in this volume have a stronger underlying conceptual basis than North American papers typically possess. In keeping with the Series' approach, all the chapters are in English, and the reader can speculate if the formulation or translation of ideas from the many languages of the contributors into English has had limiting or complementary effects.

However, looking at the ten chapters, it can be asserted that the essence of the European tradition has indeed made the precarious jump from the

polyglot tongues of Europe to the brave new homogenized world of universal English speakers. Consider the variety of topics covered. Consider the variations in method, and in nuances of data gathering and sense-making in various studies. Consider the examples of cross-border collaboration, literature reviewing, and data gathering among the contributors.

Indeed, among the major ways researchers think about research topics and approaches, the lesson of these ten chapters by many of the “new breed” of European entrepreneurship researchers is that those values and worldviews which have traditionally been the hallmark of the European approach, remain evident as the underpinnings of the “new breed” approach. This suggests that the “new breed” is an adaptation of European traditions and mores to the changing worldwide market for theories, ideas or paradigms or mindshare (which are nearly equivalent concepts operationally in academic cultures in different parts of the world).

If this is true, then the “new breed” are the contemporary version of the ancient European tradition of explorer. In this case the “new breed” are exploring the English-speaking world of academia, bringing back riches in the forms of concepts, terminology, techniques, and connections which can help future generations of European researchers exploit the riches of the worldwide market for business, and more specifically entrepreneurship, knowledge. If the explorer metaphor holds true, these modern explorers will still face perils in the process of discovery and in the process or repatriating their findings in their home cultures.

What will this mean for the “new breed”? As a larger movement, the answer depends very much on one’s point of view. However challenging exploring the new is for the pioneering individuals, the positivist tradition suggests that these efforts have always benefited the larger culture. The European phenomenological (Berglund, 2005) and deconstructionist (Werbner, 1999) traditions have suggested that the pioneering efforts fail if they are not considerate of the costs of discovery on the upheaval of those not in the larger culture. There is also the nihilist tradition of Europe, which suggests that no good idea or deed goes unpunished. For example, Melossi (2003) gives an example of the downside of human migration, one of McClelland’s (1961) indicators of higher achievement motivation. Amazingly, all three approaches can consistently find supporting evidence, and the choice of different points of view remains one of the enduring cultural realities of the European community.

At a simpler level, the meaning of the “new breed” on entrepreneurship research worldwide is clear. As the “new breed” learns the language and culture of the dominant paradigm, the field of entrepreneurship will grow in

terms of the range of ideas, data sources, and techniques. It will also grow more competitive, initially through the addition of new people, but as their ideas begin to gain traction, as differing worldviews and approaches come to the fore, perhaps sometimes go into conflict. However, that sort of exchange, one which broadens each participant, is what science and academia is all about, and the “new breed,” through efforts such as the volume you are holding, are working to initiate that process.

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HABITUAL ENTREPRENEURS EXPERIENCING FAILURE: OVERCONFIDENCE AND THE MOTIVATION TO TRY AGAIN

Deniz Ucbasaran, Paul Westhead and Mike Wright

Businesses do indeed fail. Although it is difficult to determine the exact number of businesses that fail in any one year, it is reported that in the US in 2001, 12,457 businesses entered Chapter 7 proceedings, that is, legally filed for bankruptcy and ceased operations (Shepherd, 2003). This figure does not include those businesses that were not obliged to legally declare bankruptcy but were forced to close their doors due to insolvency, and therefore likely represents an underestimation of the businesses that failed in 2001. In the UK, the annual rate of de-registrations is equivalent to the number of new businesses registered for tax purposes (Department of Trade and Industry, 2003). In financial terms, business failure occurs when a fall in revenues and/or rise in expenses are of such magnitude that the firm becomes insolvent and is unable to attract new debt or equity funding; consequently, it cannot continue to operate under the current ownership and management (Shepherd, 2003). McGrath (1999) defines failure more broadly as the termination of an initiative that has fallen short of its goals.

McGrath (1999) uses real options reasoning to argue that there are benefits to be gained from business failure. She proposes that there are advantages associated with the pursuit of high-variance opportunities, even if that

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pursuit increases the potential for failure. This entrepreneurial process of hypothesis testing generates improvements in technologies and increases economic resilience (Hayek, 1945). Entrepreneurship scholars are consistent with many organizational scholars regarding the benefits of learning from failure (e.g., Maidique & Zirger, 1984; Nonaka & Takeuchi, 1995; Starkey, 1998). A specific type of learning is recalibration.

Calibration relates to the difference between one's predicted accuracy and one's actual accuracy in providing the correct solution or answer. Cognitive psychologists use calibration as a means of assessing overconfidence. Overconfidence tends to manifest itself when the expected likelihood of being accurate is exceeded by actual accuracy. Evidence suggests that many entrepreneurs are overconfident and therefore 'poorly calibrated'. For example, Cooper, Woo, and Dunkelberg (1988) found that 81% of the 2,994 founders surveyed believed their ventures' chances of success were over 70% and one-third of the sample believed their chances of success to be 100%. Such confidence belies a much higher base rate of failure. Headd (2003) analyzed US census data and found that 34% of new ventures did not survive the first two years, 50% did not survive four years and 60% did not survive six years (see also, Phillips & Kirchoff, 1989 for similar results). Founder overconfidence may sow the seeds for venture failure (Hayward, Shepherd, & Griffin, 2006) but it may be necessary for entrepreneurship to occur (Busenitz & Barney, 1997). Venture failure might also sow the seeds for reduced overconfidence in subsequent ventures. There is a need, therefore, to understand the relationship between failure and overconfidence.

Although failure can provide a number of general learning benefits (cf. Sitkin, 1992), and, in particular, reduced overconfidence, it may adversely impact the motivation to try again. Failure can be a traumatic event that generates negative effect (grief) that can interfere with learning and the motivation to try again (Shepherd, 2003). For the benefits of failure to materialize, the entrepreneur must be willing to found a subsequent business(es). But are those that try again after a business fails different from those that try again only after successes? Specifically, of the entrepreneurs that found multiple businesses (i.e., habitual entrepreneurs): (1) do those who have experienced failure report lower overconfidence than those who have only experienced successes? (2) Do those who have experienced failure engage in fewer entrepreneurial pursuits? and (3) to what extent does their perceived performance at entrepreneurial pursuits have an effect on the persistence of overconfidence?

Relying on theory and evidence from behavioral work on overconfidence and the trauma literature on assumptions of self, we investigate the above questions on a sample of 190 habitual entrepreneurs. In doing so, we make three

contributions. First, although the entrepreneurship and failure literatures have conceptually acknowledged both benefits and costs of failure, there has been little empirical research on the distinguishing features of those that have failed from those that have only experienced successes. Our unique sample of habitual entrepreneurs provides the basis for a conservative test of these differences.

Second, the entrepreneurship literature has focused its individual differences research on distinguishing entrepreneurs from non-entrepreneurs (e.g., [Busentiz & Barney, 1997](#); [Baron, 1998](#); [Simon, Houghton, & Aquino, 2000](#)). Instead, we focus on a sample of entrepreneurs and explore their heterogeneity by testing for differences based on failure experiences.

Third, most of the overconfidence literature is based on studies of students in laboratory experiments. Although this helps to build our understanding of causal relationships in a controlled setting, advancements can be made by investigating overconfidence in the field. [Cooper et al. \(1988\)](#) represent an important exception. Cooper et al.'s evidence was based on data from 2,994 entrepreneurs. Alongside, demonstrating that a considerable proportion of entrepreneurs were overly optimistic about the chances of their business succeeding (when compared to base rates), they also found that this confidence was prevalent among both experienced and inexperienced entrepreneurs. In this study we build on this work by investigating heterogeneity of overconfidence in a sample of entrepreneurs. In particular, we extend Cooper et al.'s work to explore whether overconfidence might vary depending on the *nature* of prior entrepreneurial experience. While experienced entrepreneurs who have been repeatedly successful may be just as overconfident as inexperienced ones; those habitual entrepreneurs who have experienced failure may report lower levels of overconfidence.

This article proceeds as follows. First, we draw on behavioral decision theory and the trauma literature to examine the relationship between the experience of failure and overconfidence. Second, we explore whether the experience of failure influences the entrepreneur's willingness to pursue further opportunities and their perceptions of success associated with these pursuits. Third, we describe our data and methods, followed by our findings. Finally, we reflect on and discuss the implications of our findings.

FAILURE, OVERCONFIDENCE AND THE MOTIVATION TO TRY AGAIN

Although it has been argued that overconfidence can lead to failure ([Hayward et al., forthcoming](#)), business failure can undermine assumptions about the

self that are integral to (1) confidence in one's decision-making accuracy and (2) the motivation to engage in tasks.

Business failure can represent a traumatic event which generates negative emotions that are consistent with grief over the loss of a loved one (Shepherd, 2003). The events that cause trauma differ greatly, but the psychological impact is similar in important ways across these different events (Janoff-Buhlman, 1992). Traumatic events are those that are perceived by the individual as an out-of-the-ordinary occurrence that cause a massive assault on fundamental assumptions about the world and the self, leaving one's inner world in turmoil (Janoff-Buhlman & Frieze, 1983; Janoff-Buhlman, 1985, 1989a, 1992).

Janoff-Buhlman (1992, p. 58) points out that "There are numerous traumatic events that do not seem to involve explicit instances of injury and death, yet the threat of survival nevertheless underlies their power to strike our fundamental assumptions about the world and ourselves. ... such threats may also be engendered in events that entail abandonment and separation. ... The woman or man who has lived for and through a spouse and then experiences his or her death or divorce is apt to confront frightening questions of self-preservation." The negative emotions associated with the loss of a loved one have been argued to be similar to those felt by entrepreneurs after the loss of their businesses (Shepherd, 2003).

Janoff-Buhlman (1992) proposes that we each have a conceptual system, based on a hierarchy of assumptions that provide us with expectations about the world and ourselves. At the top of this hierarchy are three fundamental assumptions: the world is benevolent, the world is meaningful and the self is worthy (Janoff-Buhlman & Frieze, 1983; Janoff-Buhlman, 1985b, 1989a, 1992). In particular, core assumptions of the self (self-worth) represent a global evaluation of the self, and, in general, individuals perceive themselves as good, capable and moral individuals (Janoff-Buhlman, 1992, p. 11). The construct of self-esteem captures individuals' assessments of oneself in terms of general goodness and morality, and the construct of self-efficacy captures the self-assessment of capability. As intimated earlier, failure represents a massive assault on the individual's fundamental assumptions. In particular, assumptions of the self are shattered such that one's self-esteem is dramatically diminished.

Most entrepreneurs likely find business failure to be a traumatic event – one that is out-of-the-ordinary, directly experienced and is perceived to threaten one's existence. For entrepreneurs to perceive business failure as out-of-the-ordinary appears to be inconsistent with facts about the prevalence of business failure reported above, but there is an important distinction

between a general awareness that something might occur and the likelihood that it will happen to oneself (Janoff-Buhlman, 1992). The non-normative nature of events defines individuals' typical failure to actually consider these extreme experiences in their cognitive-emotional worlds. To a specific entrepreneur, the failure of his or her business is not consistent with expectations (Cooper et al., 1988).

Business failure is directly experienced by the self-employed. The self-employed are typically emotionally attached to their business (Bruno, McQuarrie, & Torgrimson, 1992; Cova & Svanfeldt, 1993; Meyer & Zucker, 1989), and when it is lost they experience negative emotions, physiological symptoms and confront a sense of personal vulnerability. The psychological impact of business failure and the willingness to try again is captured in this quote from an entrepreneur reported in the Wall Street Journal (Lancaster, 2002).

As anyone who has suffered through a business failure can tell you, the aftermath isn't pretty. You're wallowing in debt (often money that you've mooched from friends and relatives), your self-esteem has nose-dived into the depths, your future is in grave doubt and everyone around you is giving you that Elephant Man look – equal parts pity, revulsion and fear. Questions nag at you. Will I be able to get back on the horse again? Will bankers still consider me creditworthy? Will talented people be willing to bet their future on my ideas? Indeed, the uncertainty and loss of self-respect often seem to prevent one from appreciating any enlightenment behind the clouds.

The implication for re-entry into self-employment is that the entrepreneur of a failed business must re-build self-confidence. Confidence in one's chances of success (and even overconfidence) is necessary for an individual to become self-employed. For example, Busenitz and Barney (1997) propose that optimistic overconfidence is useful for entrepreneurship, otherwise individuals might not start businesses, i.e., if entrepreneurs fully evaluated all available information, they might miss the "window of opportunity" or freeze from "paralysis by analysis." It appears necessary that self-esteem be restored before re-entry into self-employment is likely. For example, Nicholas Hall, an entrepreneur who has experienced three business failures, admits that "business failures leave considerable emotional wreckage in their wake. That's why many failed entrepreneurs hesitate to try again." On re-entering self-employment Mr. Hall notes "The biggest hurdle to overcome is yourself, just believing in yourself again" (Hartsock, 2001).

Over time some entrepreneurs that have suffered business failure do try self-employment again. Although entrepreneurs that have experienced failure and re-enter self-employment have likely "re-built" their self-confidence, we propose that their general level of overconfidence is less than those

entrepreneurs that try again after experiencing only successes. Therefore, the trauma of business failure lowers habitual entrepreneurs' confidence over their decision accuracy. Thus,

Hypothesis 1. Habitual entrepreneurs who have experienced failure will have lower overconfidence than habitual entrepreneurs who have only experienced successes.

Over and above a hit to overconfidence, failure experiences are likely to have diminished entrepreneurial motivations, even among entrepreneurs that have founded subsequent businesses. Failure at a specific task can reduce an individual's belief in their ability to be successful at the task in the future (Bandura, 1994). With a perceived lower chance of success, individuals are less likely to engage in the task (Pajares, 2002). For example, beliefs about one's ability shape whether people attend to opportunities or obstacles (Krueger & Dickson, 1993, 1994). Those who believe in their own abilities focus on opportunities and view obstacles as surmountable, whereas those with weaker beliefs dwell on the risks to be avoided (Bandura, 1997). Therefore, the trauma of failure is likely to lower habitual entrepreneurs' beliefs about their own abilities and consequently reduce their motivation to pursue subsequent opportunities. In contrast, success has been associated with overconfidence in one's own efficacy, and a tendency for the successful individual and others around him/her to assume that previous success implies superior ability (McGrath, 1999). Entrepreneurs with a successful track record may, therefore, find it easier to obtain support (financial or otherwise) for subsequent opportunities they identify. Thus,

Hypothesis 2. Habitual entrepreneurs who have experienced failure will be associated with a smaller number of opportunities pursued than habitual entrepreneurs who have only experienced successes.

Above we have argued that the trauma of business failure is reflected in entrepreneurs' lower overconfidence but that the experience of failure is also reflected in the reduced pursuit of opportunities. There is more to the pursuit of opportunities than simply the number of attempts. Considering the perceived success of one's attempts puts a failure in context. Venkataraman et al. (1990) argue that entrepreneurship should be viewed as a combinative process of inter-related advances and setbacks. For habitual entrepreneurs, it may be useful to consider each venture outcome as part of a wider portfolio. If a failure occurs among a series of perceived successes, then failure is more likely to be explained to oneself as an anomaly (possibly external attribution), maintaining confidence in one's decision accuracy. In fact,

McGrath (1999) argues that a single failure may result in reactance, a process whereby a person becomes more motivated to overcome setbacks after experiencing one. Multiple failures in the absence of successes may, however, result in a loss of faith in one's ability to conquer adversity. If the failure takes place within the context of a number of successes, then the initial "hit" to positive assumptions about self-following a failure may be rebuilt reasonably quickly. If, on the other hand, failure is perceived in a context of few successes, then the hit to overconfidence is expected to persist. Thus,

Hypothesis 3. Controlling for the number of opportunities pursued, the likelihood habitual entrepreneurs have experienced a failure is lower for those with higher overconfidence, but this relationship is less negative for those who report more opportunity successes than those who report fewer opportunity successes.

RESEARCH METHOD

Sample, Data Collection and Respondents

Based on sampling quotas for four broad industrial categories (i.e., agriculture, forestry and fishing, production, construction and services) and the eleven government official regions from summary tables detailing the population of businesses registered for value-added tax in Great Britain in 1999 (Office for National Statistics, 1999), a stratified random sample of 4,324 independent firms were provided by Dun and Bradstreet. A structured questionnaire was mailed during September 2000 to each firm's founder or, if no founder was listed to the principal owner. During the four-month data collection period, respondents who were not the key business owner or founder, those who had only inherited businesses and those who indicated that the surveyed business was no longer an independent trading entity were removed. After a three-wave mailing (i.e., two reminders), 767 valid questionnaires were obtained from a valid sample of 4,253 independent firms, producing an 18% valid response rate. This response rate compares favorably with similar studies (Storey, 1994), which generally have much shorter and less-detailed research instruments.

Given the key issues under exploration in this study (i.e., information search, opportunity identification and pursuit) and the emphasis on the entrepreneur as the unit of analysis, a key informant approach was adopted

(Kumar, Stern, & Anderson, 1993). Although information was not available from multiple respondents, reliability checks were conducted on key firm-level variables such as business age, employment size and legal status. There was a strong correlation between these variables reported by the key informant and the archival data provided by Dunn and Bradstreet. The correlations ranged from 0.77 to 0.88, suggesting that the data collected from the key informant was reliable.

Given the scope of this study, only habitual entrepreneurs (i.e., those entrepreneurs who own or have owned at least two businesses) are included in the analysis. When cases with missing variables were excluded, we are left with a valid sample of 190 habitual entrepreneurs. Among the habitual entrepreneurs, 128 (67.4%) had experienced at least one business failure.

Sample Representation

Using χ^2 and Mann Whitney 'U' tests, no statistically significant response bias was detected with regard to industry, standard government official region, legal form, age of the business and employment size between the respondents and non-respondents at the 0.05 level. On these criteria, we have no reason to suspect that this sample of firms is not a representative sample of the population of independent private firms in Great Britain. However, since we are taking only a sub-sample (i.e., habitual entrepreneurs) and because there is no publicly available data on the characteristics of habitual entrepreneurs, we cannot conclude that our valid sample is representative of the population of habitual entrepreneurs in Great Britain. Owing to missing variables from a sample of 382 habitual entrepreneurs, analysis was conducted on a valid sample of 190 habitual entrepreneurs. The habitual entrepreneurs in the valid sample were compared with the habitual entrepreneurs who had filed missing responses. While there were no significant differences between the two groups in terms of their chosen industry, gender, ethnicity, education levels and number of business failures, the habitual entrepreneurs in the valid sample were younger and had owned more businesses. Therefore, caution is warranted when interpreting the results.

Measures

Dependent Variable

Experience with Business Failure. The dependent variable relates to whether the habitual entrepreneur had experienced business failure. Business failure involved the entrepreneur closing or selling a business because 'the performance

of the business was too low in relation to the entrepreneurs' expectations' or 'bankruptcy/liquidation/receivership'. Habitual entrepreneurs who had experienced at least one business failure was allocated a score of '1', while those that had not experienced business failure were allocated a score of '0'.

Independent Variables

Overconfidence. Entrepreneurs' overconfidence was captured using an experimental design and was measured using a procedure similar to earlier studies (Baron & Markman, 1999; Busenitz & Barney, 1997; Russo & Shoemaker, 1992). The procedure involves reporting subjects' responses to a series of general knowledge questions. In this study, subjects were presented with eight questions such as 'which county in the UK has the highest unemployment rate?' Subjects were then asked to provide an answer to the question (as did Russo & Shoemaker, 1992) and then indicate how confident they were in their estimate. The scale used to measure how confident the subjects were was similar to the one used by Busenitz and Barney (1997), but modified in line with the suggestions of Baron and Markman (1999). Accordingly, the scale ranged from 0% (indicating confidence that the subject is wrong), 50% (indicating that the subject is guessing) and 100% (indicating confidence that the subject is correct). Two figures were then calculated for each respondent: the percentage of correct answers and the mean confidence level calculated for all questions. Measures for over or underconfidence were then calculated by subtracting the percentage of correct answers from the average confidence level. A positive score indicates overconfidence, whereas a negative score indicates underconfidence).

Number of Opportunities Pursued. Consistent with the creativity (Amabile, 1990) and innovation (Daft, 1978) literatures, opportunity pursuit was operationalized in terms of the number of opportunities for creating or purchasing a business identified that were then pursued (i.e., committed time and financial resources) within the last five years. Respondents were presented with eight opportunity pursuit outcomes (i.e., 0, 1, 2, 3, 4, 5, 6–10, or more than 10 opportunities). Respondents who reported that they had not pursued any opportunities were allocated a score of '1', while those who had identified more than 10 opportunities were allocated a score of '8'.

Number of Successful Opportunities. Respondents were asked to indicate the number of opportunities for new businesses they perceived to be successes (in terms of meeting their expectations) within the last five years. Consistent with the operationalization of the opportunity pursuit variable (see below),

respondents who reported no successful opportunities were allocated a score of '1', while those who reported 10 or more successful opportunities were allocated a score of '8'.

Control Variables

To appreciate the role of overconfidence and 'small wins', we controlled for a number of variables that proxy for the entrepreneur's motivations, capabilities and knowledge. We also controlled for the number of opportunities pursued.

Motivations for Business Ownership. A wide variety of motivations for entrepreneurship have been identified in the literature (Birley & Westhead, 1994). Motivations shape our preferences which subsequently guide our choices (Delmar, 2000). Twenty-three statements relating to motives for business ownership taken from previous studies were presented to the respondents. Consistent with previous studies, seven components were extracted using a Principal Components Analysis (PCA).¹ Component 1 has been named '*approval*' to reflect motives for business ownership based on the desire for recognition, respect, status and influence. Component 2 has been named '*welfare*' to largely reflect motives based on the desire to ensure the welfare of others (such as family, community and people with a similar background as the respondent). Component 3 relates to statements suggesting flexibility, control, autonomy and independence as a key motivation for business ownership and has consequently been named '*independence*' to reflect this. Component 4 has been named '*personal development*' to reflect motives such as 'the desire to be challenged by the problems and opportunities of owning a business', and 'to continue learning'. Component 5 related to financial reasons for business ownership, such as the desire for financial security and the generation of personal wealth. Consequently, this component was named '*financial*'. Component 6 has been named '*tax*' to reflect tax-related motives such as the desire to reduce one's tax burden or benefit from tax exemptions. Finally, component 7 related to 'reactive' reasons for business ownership, such as taking advantage of an opportunity that presented itself or business ownership making sense at that particular point in time. Hence, component 7 was named '*reactive*'. This latter component was later dropped due to reliability reasons (see below).

Knowledge and Ability. We use three proxies for knowledge and ability guided by previous research, namely education, age and prior entrepreneurial experience.

Age: More mature entrepreneurs may have more diverse skills and experience. However, as part of the ageing process, the human capital stock depreciates over time and requires investment to maintain its value. [Cressy \(1996\)](#) argues that if investment decreases exponentially with age, the relationship between human capital and age will be concave. Therefore, two indicators of age were selected: age and age². Respondents indicated their age in years. To avoid the problem of multicollinearity, the age of the owner was measured in terms of the deviation from the mean age (i.e., 49), and age of the owner² was measured at the deviation from the mean age² ([Aiken & West, 1991](#)). Since a non-linear relationship was not found during the analysis, we include only the age of the owner in years in the reported analysis.

Education: To control for the knowledge of the entrepreneur we also include education among our control variables. Education is measured in terms of years of formal education.

Business Ownership Experience: Controlling for knowledge and motivations, those entrepreneurs who have greater levels of business ownership experience may be more likely at some stage to have experienced failure due to factors outside their control. We therefore control for business ownership experience by taking the total number of businesses owned throughout each respondent's entrepreneurial career.

Validity

The structured questionnaire was sent to leading practitioners and academics. To source potential problems and address the problem of face validity, the questionnaire was piloted on six entrepreneurs and two internationally recognized leading academics in the field of entrepreneurship. Comments were incorporated within a revised structured questionnaire. No major problems with the structured questionnaire were detected.

Convergent and discriminant validity were judged using PCA. Component loadings ranged from 0.51 to 0.86 for the seven motivation scales. All component loadings are statistically significant. Convergent validity is, therefore, apparent with regard to all constructs. The pattern of components appears to be logical and consistent with the literature relating to entrepreneur capabilities and motivations. The measures also appear to exhibit discriminant validity insofar as the statements load significantly on one component.

The results of the PCA can also be used to assess the degree to which common method bias might present a problem (see for example [Tippins & Sohi, 2003](#)). The average statement loading on the intended construct was

0.71. Of the 161 potential cross-loadings, only eight were above 0.30 with the largest being 0.45. The fact that the constructs are consistent with the literature and the absence of cross-loadings among the statements provides confidence that common method bias is not a major problem.

Reliability

The reliability of the motivation scales was also satisfactory ranging from 0.63 to 0.85, with one notable exception. The final component ‘reactive’ was associated with a Cronbach’s α score of 0.52. This latter item was dropped from subsequent analysis.

RESULTS

The means, standard deviations and correlations for the variables are provided in Table 1. Table 1 also provides the variance inflation factor (VIF) scores for the independent and control variables. While the correlation matrix highlights a number of significant correlations, the VIF scores are all well under the recommended upper limit of 10 (Hair, Anderson, Tatham, & Black, 1998). Consequently, we do not expect the results to be affected by serious multicollinearity.

Hypotheses were tested using logistic regression analysis. Logistic regression analysis is an appropriate technique to explore the combination of variables associated with a binary dependent variable. This technique does not have limiting assumptions surrounding data normality. The logistic regression models used to test the hypotheses are presented in Table 2. Three models are presented: the base model (control variables only), the main effects model and the full model including interactions. All models are statistically significant. The change in model fit (R^2) associated with the sequential introduction of the independent and interaction variables was monitored. The main effects model makes a significant contribution over and above the base model ($\Delta R^2 = 0.05, <0.05$). The results from the main effects model show that habitual entrepreneurs who had experienced failure were not associated with significantly lower levels of overconfidence. Therefore, Hypothesis 1 was not supported. While the coefficient for opportunities pursued is significant, the direction of association is the opposite of what we hypothesized. Therefore, Hypothesis 2 is not supported.

The interaction between the variables ‘overconfidence’ and ‘number of opportunities perceived to be successful’ makes a significant contribution

Table 1. Means, Standard Deviations and Correlations for Continuous Variables.

Variables	Mean	S.D.	VIF	1	2	3	4	5	6	7	8	9	10	11	12
1 Failure (D.V.) ^a	0.33	0.47		1											
2 Approval	0.01	1.07	1.08	0.11	1										
3 Welfare	-0.07	0.93	1.08	0.15*	0.04	1									
4 Pers. dev. ^b	0.08	0.99	1.06	-0.02	0.02	-0.02	1								
5 Independence	0.06	0.93	1.09	-0.08	0.07	0.00	-0.10	1							
6 Financial	-0.01	0.98	1.09	0.03	-0.02	0.02	-0.09	-0.10	1						
7 Tax	-0.04	0.95	1.06	0.03	0.07	-0.04	-0.04	-0.09	-0.02	1					
8 B.O.E ^c	3.64	3.02	1.14	0.27**	-0.07	0.13	0.05	-0.04	0.02	0.02	1				
9 Age ^d	48.2	9.41	1.09	0.01	0.01	0.16*	-0.11	0.05	-0.07	0.04	0.09	1			
10 Education	13.5	2.35	1.13	0.02	-0.16*	-0.01	0.04	-0.11	-0.20**	0.10	-0.01	-0.07	1		
11 Overconfidence ^e	0.32	0.19	1.12	-0.06	0.12	0.01	0.01	0.04	0.04	0.03	0.01	0.00	0.06	1	
12 Opp. pursued ^{e,g}	2.89	1.40	3.02	0.10	0.02	0.00	0.09	0.01	0.04	0.02	0.26**	-0.08	0.03	0.10	1
13 Opp. successes ^{f,g}	2.31	1.20	3.01	-0.03	-0.01	0.03	0.09	0.09	0.05	0.08	0.19**	-0.13	0.01	0.13	0.80**

Note: n = 190.

^aRepresents the dependent variable.

^bPersonal development.

^cBusiness ownership experience.

^dAge of entrepreneur.

^eNumber of opportunities pursued.

^fNumber of opportunities pursued that were perceived as successes.

^gThese measures were centered to avoid problems of multicollinearity. The mean and standard deviations reported above relate to the 'un-centered' measures but the correlations relate to the centered measures.

Table 2. Independent and Contingency Models of Overconfidence, Successful opportunities and Business Failure Experience.

	Base Model		Main-Effects-Only Model		Full Model	
	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
Constant	-1.79	1.39	-2.84*	1.54	-3.39**	1.58
Approval motive	0.30*	0.16	0.29*	0.16	0.32**	0.17
Welfare motive	0.28	0.18	0.33*	0.18	0.25	0.19
Personal development motive	-0.11	0.17	-0.11	0.17	-0.10	0.18
Independence motive	-0.19	0.19	-0.14	0.20	-0.11	0.20
Financial motive	0.05	0.17	0.07	0.18	0.14	0.18
Tax motive	0.01	0.18	0.06	0.19	-0.01	0.19
Business ownership experience	0.24***	0.08	0.23***	0.08	0.24***	0.09
Age of owner	-0.01	0.02	-0.02	0.02	-0.01	0.02
Years of education	0.06	0.07	0.05	0.08	0.09	0.08
Overconfidence	—	—	-0.87	0.91	-1.33	1.02
Opportunities pursued	—	—	0.45**	0.21	0.39*	0.21
Successful opportunities	—	—	-0.57**	0.24	-0.57*	0.25
Successful opportunities × Overconfidence	—	—	—	—	2.58***	0.89
Model						
Model χ^2	22.28**		29.70*		39.99***	
-2 log likelihood	217.51		210.29		200.00	
Cox & Snell R^2	0.11		0.15		0.19	
Nagelkerke pseudo R^2	0.16		0.20		0.27	
Change in R^2	—		0.05**		0.07***	
Overall predictive accuracy (%)	74.2		72.1		73.7	
Number of respondents	190		190		190	

Note: $n = 190$ habitual entrepreneurs of which 128 have experienced failure and 62 have not.

* $p < 0.10$;

** $p < 0.05$;

*** $p < 0.01$.

over and above the main effects ($R^2 = 0.07$, < 0.01) (see full model in Table 2). It should be noted that the variables in question were centered. Centering involves subtracting the mean from a variable, leaving deviation scores. The advantages include making otherwise uninterpretable regression coefficients meaningful and reducing multicollinearity among predictor variables (Aiken & West, 1991). We plotted the association between overconfidence and the likelihood of having experienced failure for values of

successful opportunities set at the mean and at one standard deviation above and below the mean, as suggested by Cohen and Cohen (1983) (see Fig. 1). Supporting Hypothesis 3, the plot indicated that the number of successful opportunities reported influenced the nature of the relationship between overconfidence and the experience of failure. In particular, we find that when controlling for the number of opportunities pursued, the likelihood habitual entrepreneurs have experienced a failure is lower for those with higher overconfidence, but this relationship is less negative for those who report more opportunity successes than those who report fewer opportunity successes. This finding provides support for Hypothesis 3.

Overall, we find support for Hypothesis 3 but not for Hypotheses 1 and 2. Interestingly, while the coefficient for the number of opportunities pursued is significant, we cannot support Hypothesis 2 because the sign is opposite of what we hypothesized. We reflect on this finding in the discussion.

DISCUSSION AND CONCLUSION

The purpose of this paper was to gain an understanding of whether the characteristics of habitual (i.e., experienced) entrepreneurs who have experienced failure are different from those who have only experienced successes. We draw on behavioral work on overconfidence and the trauma literature to

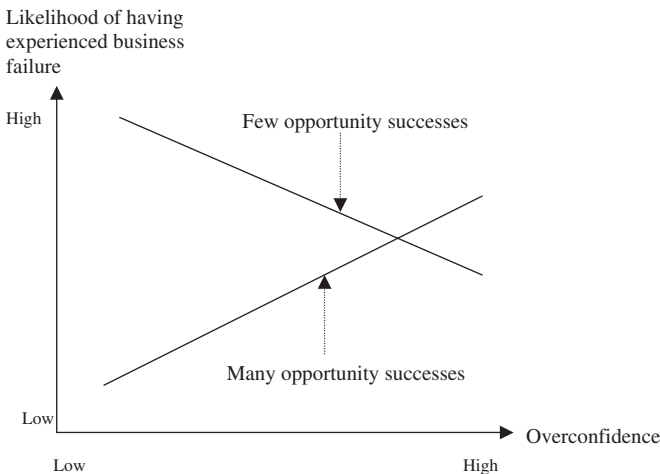


Fig. 1. The Moderating Role of Successful Opportunities on the Relationship between Overconfidence and the Experience of Failure.

develop a set of hypotheses. We do not find that habitual entrepreneurs who have experienced failure are associated with lower overconfidence or that they pursue fewer opportunities. In contrast to expectations, we found that habitual entrepreneurs who had experienced failure actually pursued significantly more opportunities than those who had not experienced failure. One possible explanation for this finding may be offered by the prospect theory (Kahneman & Tversky, 1979). If we view habitual entrepreneurs as pursuing an entrepreneurial career, the experience of a failure may result in their perceiving themselves in a loss situation. The prospect theory suggests that when confronted with a loss situation, individuals exhibit risk-seeking behavior. This may manifest itself in the form of pursuing more opportunities. We could speculate, therefore, that those entrepreneurs who have failed see themselves as being in a loss situation and pursue more opportunities to “catch up”. Alternatively, if entrepreneurs view the outcome of a venture as one of many (in the past, present or future), they may adopt an options perspective (McGrath, 1999), whereby they have small “bets” on more opportunities and accept that some will fail. Indeed, interviewing ‘expert’ entrepreneurs, Mitchell (1997) found that many saw failure as an “entrance fee” for entrepreneurship and considered it as a “part of venturing life.” Further research is required to explore these themes.

In our final hypothesis we proposed that the relationship between having experienced a failure and overconfidence would be moderated by the number of successful opportunities reported. We find support for this hypothesis. In particular, among those entrepreneurs that had experienced failure, the level of overconfidence was higher for those who reported a high number of opportunities perceived to be successes than those who reported few opportunities they perceived to be successes. This suggests that overconfidence can return to those who have experienced failure if they continue to pursue opportunities and experience some success. It appears that for those who have experienced a mixture of success and failure, the emotional costs of failure can be compensated for. This wider set of experiences to draw upon can boost their confidence. In the absence of a number of successful opportunities to provide a context for failure, the traumatic effects of venture failure may endure.

There are a number of limitations associated with the study, some of which offer avenues for future research. The main limitation of the study is its cross-sectional nature. This means that we have been unable to address issues relating to causality and timing. The timing of failure may have important implications for the theoretical perspective used and the interpretation of findings. The grief and trauma literatures may be more appropriate

for dealing with failure that has recently occurred. Over time, however, less emotional responses and interpretations of failure may ensue (Cannon, 1999). Further research might usefully examine whether the time delay between failure and subsequent entrepreneurial activity is important in searching more carefully for lower risk opportunities.

A second limitation relates to the magnitude and nature of failure. In this study we distinguish between entrepreneurs that have experienced at least one failure and those that have not. However, among those that have failed may be entrepreneurs that have experienced a single failure and those that have experienced many failures. The proportion of failures vis-à-vis the total portfolio of the entrepreneur's businesses or personal wealth may also be important. In addition, the nature of failure is likely to be important. In this study we defined failure as bankruptcy/liquidation and/or the business failing to meet the entrepreneur's expectations. It is possible that entrepreneurs respond differently to alternative 'types' of failure. Future research may benefit from taking a more refined categorization of failure.

Finally, we are unable to make normative judgments on the basis of this study because we do not know the welfare effects of overconfidence and failure. However, future studies might usefully explore the effects of overconfidence and failure on the quality of opportunities identified as well as the performance of ventures owned.

To conclude, we have sought to make a contribution to the understanding of the widespread though empirically under-researched area of entrepreneurs' business failure. We have highlighted that the experience of failure is associated with changes in the entrepreneur's cognitive profile (i.e., overconfidence) under certain conditions (depending on the number of successful opportunities).

NOTES

1. KMO measure of sampling adequacy = 0.82; Bartlett's test of sphericity is significant at 0.001 level; cumulative % of variance explained is 66%. Further details are available from authors upon request.

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META-ANALYSIS AS A TOOL FOR DEVELOPING ENTREPRENEURSHIP RESEARCH AND THEORY

Andreas Rauch and Michael Frese

Compared to other disciplines, the field of entrepreneurship can still be described as young and being in a formative stage (Cooper, 1997). Entrepreneurship research is an area that is characterized by the presence of competing and overlapping concepts and theories, such as entrepreneurial orientation (Covin & Slevin, 1991), cognitive alertness (Gaglio & Katz, 2001; Kirzner, 1997), entrepreneurial management (Brown, Davidsson, & Wiklund, 2001), or opportunity discovery and exploitation (Shane & Venkataraman, 2000). There is still a continuing debate on what entrepreneurship is about and the existence of relationships are hotly debated (Davidsson, Low, & Wright, 2001), e.g., the relationship between personality and entrepreneurial behavior. As a consequence, the field of entrepreneurship struggles to develop practice recommendations, e.g., for entrepreneurs, that are based on well-defined concepts and sound empirical justification.

In general, there are two ways of determining the status of a field: narrative reviews and meta-analysis. Narrative reviews use informal methods for the synthesis of empirical studies. The overall conclusions of narrative

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reviews are based on reviewers' considered impressions – often guided by a count of significant results based on “critical studies” (Johnson & Eagly, 2000). Narrative reviews are often subject to biases and judgments that are not reproducible (e.g., the judgment which critical study is the best and most believable one). Most reviews in the field of entrepreneurship use narrative methods (see e.g., Chandler & Lyon, 2001; Cooper & Gimeno-Gascon, 1992; Low & MacMillan, 1988). In contrast, meta-analysis uses statistical methods to integrate the results of many studies and is guided by decisions that are public and can be reproduced. The different approaches of meta-analyses and narrative reviews often lead to different conclusions about the validity of concepts.

The purpose of this paper is to suggest the use of meta-analysis as a technique to establish the status of concepts in the field of entrepreneurship. Meta-analysis provides the opportunity to overcome limitations of previous narrative reviews, to assess the validity of theories of entrepreneurship, to develop practice recommendations, and to open new areas of research. The contribution will hopefully stimulate the use of more meta-analyses in order to develop entrepreneurship research and theory.

The chapter proceeds as follows: First, the contributions of meta-analyses are discussed and compared with other review methods. Second, an example of meta-analysis is presented – the personality approach to entrepreneurship. Third, we describe the most important steps of meta-analysis. Fourth, potential limitations of meta-analysis are addressed. Finally, we present meta-analysis opportunities to do meta-analyses to advance entrepreneurship theory, research, and practice recommendations.

THE ADVANTAGES OF A META-ANALYTICAL APPROACH TO ENTREPRENEURSHIP

We argue that entrepreneurship research should use meta-analysis to integrate the findings of the field. A meta-analytical approach has several advantages as compared with narrative reviews: First, narrative reviews are likely to bias empirical evidence because they are limited by the information-processing capacities of the reviewers (Tett, Jackson, & Rothstein, 1991). This is often a downward bias leading to the conclusion of little positive knowledge in the field. For example, frequency counts of significant results ignore sampling errors of individual studies, reliability problems of instruments, range restrictions of samples, dichotomization of continuous variables, imperfect construct validity, and extraneous factors (Hunter &

Schmidt, 2004). These issues usually result in a higher incidence of Type II errors (i.e., rejecting the hypothesis wrongly). Thus, narrative reviews are more likely to lead to the conclusion that there are no relationships between independent and dependent variables in entrepreneurship when in fact they are (Hunter & Schmidt, 1990; Tett et al., 1991). Second, meta-analysis accumulates studies based on a set of explicit decision rules and, therefore, is less biased by subjective perceptions of the reviewer than narrative reviews. Meta-analyses require judgments as well, e.g., when defining the area of the study or coding moderator variables. However, the decisions are public and open to criticism and replication by other scientists (Johnson & Eagly, 2000). Third, meta-analysis is based on many studies and, thus, avoids the influence of single studies. Fourth, meta-analysis controls for sampling error variance and, thus, controls for power deficits of individual studies (Hunter & Schmidt, 2004). For example, the Brockhaus and Nord (1979) study is frequently cited in the entrepreneurship literature for providing evidence that there is no relationship of personality characteristics with entrepreneurship. However, this study is based on a small sample of 31 business owners and therefore, has serious statistical power problems. Noteworthy, the effect sizes of small samples are less precise in estimating a population value than effect sizes of larger samples. Fifth, meta-analyses can correct many errors of individual studies (Hunter & Schmidt, 2004). Since meta-analyses estimate population correlations between given variables, it is important to correct for errors of studies (e.g., unreliability, range restriction, and sampling error) to achieve unbiased estimates. Sixth, meta-analysis allows an assessment of the magnitude of relationships and, thus, provides more precise and often comparable assessments of the validity of concepts. Thus, meta-analyses support the assessment of the practical significance of findings. Seventh, meta-analysis tests for variations in relationships across studies and, therefore, allows an assessment of the generalizeability of effects. If the size of reported relationships varies considerably between different studies, there will be context conditions that account for these variations. These context conditions are moderators that affect the size of relationships. The moderators may include study characteristics, method moderators, and theoretical moderators. Thus, meta-analyses also help to identify areas for new studies. Finally, meta-analysis techniques allow to test more than one independent and/or moderator variable by using methods based on regression analysis (Lipsey & Wilson, 2001). Using such procedures allows to estimate the independent contribution of variables on results, to control for methodological variables, and to test the interactions between moderator variables.

There are additional theoretical contributions of meta-analytical reviews. Most meta-analyses are mainly interested in the overall effect between independent and dependent variables. However, a meta-analysis should not simply summarize the strength of effects reported in the literature but should provide a theoretical integration and an assessment of the contribution of a concept. Two types of information provide such a contribution. First, meta-analysis should examine moderator variables to assess the context to which identified effects generalize. In this way, meta-analysis allows to test (new) contingency theories as well as comparing theories with competing assumptions. Second, meta-analysis can sometimes provide new evidence and, thereby, contribute to theory development by including moderators that were not studied in the original studies. For example, meta-analysis allows coding for the national context of studies and, thus can test the cross-cultural validity of concepts.

In summary, meta-analyses as compared to narrative reviews have methodological and theoretical advantages that can be used to accumulate knowledge, build theory in entrepreneurship, and develop evidence-based practice recommendations for researchers and professionals in the field.

THE PERSONALITY APPROACH TO ENTREPRENEURSHIP AS AN EXAMPLE FOR DEVELOPING ENTREPRENEURSHIP RESEARCH AND THEORY BASED ON META-ANALYSIS

The personality approach to entrepreneurship provides a useful example for a meta-analytical approach to entrepreneurship. Several meta-analyses have been conducted on entrepreneurs' traits. Moreover, the personality approach is one of the early approaches to entrepreneurship that has been discussed controversially in the literature. Finally, narrative and meta-analytical reviews came to different conclusions about the usefulness of the personality approach to entrepreneurship theory and research. At the end of 1980s, the personality approach to entrepreneurship was rejected by many scholars in the field (cf., reviews by e.g., Brockhaus & Horwitz, 1985; Gartner, 1989; Low & MacMillan, 1988). This skepticism regarding personality traits was based on narrative reviews. In contrast, recent meta-analytic reviews reported evidence for the validity of entrepreneurs' personality characteristics (Collins, Hanges, & Locke, 2004; Rauch & Frese, 2006; Stewart & Roth, 2004; Zhao, 2004). Thus, there appear to be relationships between personality traits and entrepreneurial outcomes that are difficult to detect for narrative reviews.

Personality traits can be defined as enduring dispositions that are stable across situations and over time (Costa & McCrae, 1988). Early studies in entrepreneurship assumed direct relationships between personality traits and both business creations and business success. It is important to note that many of these studies were descriptive in nature and based on overly simplistic assumptions. A consequence is an increased likelihood for incorrectly neglecting personality effects in entrepreneurship altogether (Type II error), because the theoretical link between specific personality traits and firm performance was not well established (Tett, Steele, & Beaugard, 2003). More recent models of personality psychology assume that personality traits are not directly related to business outcomes because they influence more specific processes that are proximal to behavior, which in turn relate to business outcomes (cf., Baum, Locke, & Smith, 2001; Johnson, 2003; Kanfer, 1992; Rauch & Frese, 2000). Thus, the effect of personality traits on business creation and success is mediated by more proximal variables. This position complements with theorizing in entrepreneurship that emphasizes the importance of processes in entrepreneurship research (e.g., Shane & Venkataramen, 2000). Moreover, the effects of personality traits are dependent on situational variables (Magnusson & Endler, 1977). As a consequence, meta-analyses on personality traits of entrepreneurs should not only address the strength of relationships but test intervening variables and moderators as well. Moderator variables have been addressed in all meta-analyses of the personality approach to entrepreneurship. These analyses focused either on broad Big Five traits or on specific personality concepts relevant for the domain of entrepreneurship.

The Big Five Personality Traits

The Big Five personality taxonomy (Costa & McCrae, 1988) is one of the most frequently used broad-trait taxonomy in organizational behavior. Meta-analyses indicated consistent positive relationships between the Big Five traits (such as conscientiousness) and employees' job performance (Barrick & Mount, 1991). In entrepreneurship research such broad-trait taxonomies have been less frequently studied (exceptions are, e.g., Brandstätter, 1997; Wooton & Timmerman, 1999; Ciaverella, 2003). Zhao (2004) could, therefore, not draw directly on Big Five studies but categorized various personality traits on the five-factor model. Results indicated differences between entrepreneurs and managers in conscientiousness, openness to experience, neuroticism, and agreeableness. The effects sizes were small and moderate for conscientiousness (corrected $d = 0.45$).¹ It is

important to note that Zhao (2004) did not directly analyze Big Five traits but assembled studies according to the five-factor taxonomy. As a consequence, the study included both broad traits and traits that are related to the domain of entrepreneurship. Thus, there are different levels of specificity of traits involved in his analysis. The level of specificity or generality between predictor and criterion variables, however, affects the size of the correlation (Epstein & O'Brien, 1985; Wittmann, 2002; Tett et al., 2003). Further, Zhao's (2004) results indicated the presence of moderators and, thus, more research is needed to determine the circumstances that account for the variations in reported relationships.

Specific Personality Traits of Entrepreneurs

Most studies in entrepreneurship research analyzed more specific, criterion-validated personality characteristics rather than the Big Five traits. Broad personality traits, such as the Big Five are distal and aggregated constructs and they may predict aggregated classes of behavior (Epstein & O'Brien, 1985), such as overall supervisor ratings for employees (Barrick & Mount, 1991). In entrepreneurship research, the validity of specific traits may be higher than the validity of the broad Big Five traits because entrepreneurship research frequently uses more specific performance concepts, such as sales growth and accounting-based criteria (Rauch & Frese, 2006). Thus, the validities should be higher, if there is a match between personality and the task of entrepreneurship. Traits that have been discussed to be specifically related to the domain of entrepreneurship are need for achievement, risk-taking propensity, and innovativeness.

Need for Achievement

Need for achievement describes one's preference for new and better ways to work, for feedback, for personal responsibility for outcomes, and for challenging tasks rather than routine or extremely difficult tasks (McClelland, 1961). McClelland (1961) related need for achievement to economic outcomes, such as wealth creation, business creation, and business performance. Thus, the concept seems to be particularly relevant to the domain of entrepreneurship.

Two meta-analyses addressed correlations between the need for achievement and different sets of outcome variables (Collins et al., 2004; Rauch & Frese, 2006). A first set of analyses revealed that need for achievement differentiated between entrepreneurs and non-entrepreneurs. The sample size weighted correlation was around .220 (Collins et al., 2004; Rauch & Frese,

2006, respectively). Such an effect size is moderately high (Cohen, 1977) and as high as the effect size between TAT scores on achievement motivation and spontaneous achievement behavior (Meyer et al., 2001). Both analyses revealed that entrepreneurs' need for achievement was positively correlated with business success ($r = .260$ (Collins et al., 2004) and corrected $r = .314$ (Rauch & Frese, 2006)). Thus, we can conclude that the need for achievement is moderately related to entrepreneurial outcomes. However, tests of heterogeneity revealed the presence of moderator variables. The meta-analysis by Collins et al. (2004) identified several potential moderators (e.g., level of analysis, career choice, and performance studies versus career choice studies). No meta-analytic results showed homogeneous effects (Collins et al., 2004; Rauch & Frese, 2006). Thus, future research should address the context to get a better understanding of conditions under which the need for achievement leads to business creation and business success.

Risk-Taking Propensity

Risk-taking is one of the classical concepts that has been related to entrepreneurship (Mill, 1954; Knight, 1921) and has received a considerable amount of empirical attention. On a theoretical level, there are arguments for curvilinear as well as for direct relationships between risk-taking propensity and entrepreneurial outcomes (see, e.g., Stewart & Roth, 2001). The theoretical controversy about the function of risk-taking propensity in entrepreneurship has been continued in meta-analytic reviews – the dispute between Miner and Raju (2004) on the one hand and Stewart and Roth (2001, 2004) on the other hand can be seen as an example that meta-analysis is not immune to controversy. We agree with Stewart and Roth (2004) that there are problems in Miner and Raju's (2004) meta-analysis: they included studies with dependent samples, contaminated comparison groups (e.g., founders included in the control group), irrelevant variables, and measurements with questionable construct validity. Without these problems, Stewart and Roth (2004) showed that there was a difference in the risk-taking propensity of entrepreneurs and managers ($d = 0.23$). Moreover, variations in effect sizes were fully explained by different instruments used to measure risk-taking propensity: objective measures produced higher effect sizes than projective measures. The second meta-analysis (Rauch & Frese, 2006) found a relationship between risk-taking and business performance of $r = .092$. This relationship was of the same size as the relationship found by Stewart and Roth (2004) and it was moderated by type of performance assessment. The hypothesis of curvilinear relationships between risk-taking and success has not been addressed in enough studies to do a meta-analysis.

Innovativeness

The notion of the importance of innovations in the entrepreneurial process has already been addressed in Schumpeter's theory of economic growth (Schumpeter, 1935). Innovation can be conceptualized at the level of the firm (innovation implementation) and at the level of the individual (Klein & Sorra, 1996). Firm-level innovation has been studied in a meta-analysis by Bausch and Rosenbusch (2005), who reported a positive and significant correlation between innovation and performance of $r = .136$. Innovativeness at the individual level was studied as individual innovativeness (Patchen, 1965). A meta-analysis indicated that innovativeness is related to business creation ($r = .235$) and business success ($r = .220$) (Rauch & Frese, 2006). The relationship between innovativeness and business success was homogeneous, indicating that it was not moderated by other variables. Moreover, the relationship between entrepreneurs' innovativeness and success seemed to be higher than the relationship reported between firm-level innovations and success (Bausch & Rosenbusch, 2005). It would be interesting to know whether firm-level innovativeness reflects entrepreneurs' success in forcing innovativeness in the whole firm. Technically speaking, firm-level innovations might be a mediator in the relationship between entrepreneurs' innovativeness and success.

Conclusion and Future Prospect of the Personality Approach to Entrepreneurship

These examples show the validities of selected personality characteristics. There are additional personality traits that are related to entrepreneurial behavior across studies, such as initiative, autonomy, stress tolerance, and self-efficacy (Rauch & Frese, 2006). Narrative reviews came to different conclusions because some of these effects are small and most relationships are moderated by third variables and, therefore, difficult to detect. For example, random influences of small-scale studies might be overestimated in narrative reviews. Thus, meta-analyses provided evidence for the validities of personality traits for business creation and business performance. This indicates that an overall theory of entrepreneurial success needs to include owners' personality characteristics as extraneous variables.

However, the size and the variance of some of the reported relationships between personality traits and entrepreneurship behavior indicate that there are additional issues that need to be addressed empirically. First, the effect of personality traits is not direct. Thus, the personality approach to entrepreneurship needs to develop theories on moderators. There are theoretical as well as empirical models that suggest the need to study business strategy,

environmental conditions, competencies, and organizational variables as moderator variables (Baum, 1995; Sandberg & Hofer, 1987; Rauch & Frese, 2000). Second, there is theoretical and empirical support for the view that the relationship between personality and entrepreneurial outcomes is mediated (see above) and, therefore, the validities should be higher if one includes such mediators in the prediction of success. Candidates for such mediators are cognition and behavior (Kanfer, 1992) e.g., the processes by which individuals recognize and exploit opportunities (Shane & Venkataraman, 2000). Third, the effects of entrepreneurs' personality may depend on more than one or two single traits. Therefore, the multiple effects of several relevant personality traits will produce higher relationships with entrepreneurial behavior than any single trait. Moreover, it may very well be possible that the effects of some traits overlap with each other. Thus, we need multivariate analyses of personality traits that take the intercorrelations of traits into account. Fourth, studies and meta-analyses have paid little attention to the problem of causality. Broad Big Five traits are in part genetically determined (Jang, Livesley, & Vernon, 1996) and, therefore, might affect the decision to become self-employed. However, more specific personality variables can be changed, such as self-efficacy (Eden & Aviram, 1993) and achievement motivation (McClelland, 1987). Therefore, we need more longitudinal studies to test for reverse causality. Fifth, the personality approach to entrepreneurship needs to include new individual differences concepts, such as passion for work (Baum & Locke, 2004) and counterfactual thinking (Baron, 1999). Meta-analysis has not addressed these variables because there were not enough studies on these concepts. New individual differences concepts can be evaluated by comparing their contribution to the field of entrepreneurship with the contribution of concepts that have been established for a longer period of time. Thus, the validity of new concepts (e.g., passion for work) should be compared with the validities of established concepts (e.g., need for achievement). If new concepts do not explain incremental variance, they will probably not be very important for entrepreneurship theory. Thus, cumulative evidence on more or less established concepts to entrepreneurship can be used to assess the contributions of more recent concepts.

DESCRIPTION OF META-ANALYSIS

A basic purpose of a meta-analysis is to provide a review of the literature based on statistical analysis (Glass, 1976). Thus, meta-analysis can be used

to calibrate the relationships between a set of variables. Ultimately, this means that meta-analysis can be used to develop and validate theories in the area of entrepreneurship. To achieve these targets, a meta-analysis requires five important steps: the definition of the theoretical propositions and the scope of the study, the location and collection of studies, the creation of a meta-analytic database, meta-analytical data analysis, and the interpretation and integration of results (Johnson & Eagly, 2000).

Theoretical Analysis of the Constructs under Investigation

The goal of this step is to specify as exact as possible the theoretical relationships between constructs and the definition of variables whose relationships are under investigation (Johnson & Eagly, 2000). Thus, this step requires theoretical and operational considerations to establish the boundaries of the study. The theoretical considerations include the definition of the research question, the identification of theoretical constructs that represent the independent and the dependent variable, the identification of moderators and mediators and, importantly in entrepreneurship, the populations that are studied and to which the researcher wants to generalize the results. The operational considerations refer to the acceptability of studies in terms of the operationalizations of the constructs under investigation (e.g., sample definitions, measures of dependent and independent variables, type of effect size to be used, and methodology). The operational considerations result in a list of criteria for the inclusion of studies into the meta-analysis. Thus, the first step of a meta-analysis in entrepreneurship requires a comprehensive definition of entrepreneurs, of constructs under investigation, and of the type of entrepreneurial behavior being addressed.

Location and Collection of Studies

Typically, a meta-analysis attempts to locate every study of the defined population (Lipsey & Wilson, 2001). Any specific sample includes sampling bias, which affects the generalizability of reported results. Moreover, most meta-analyses analyze moderators that require the break down of studies into different subsets. Therefore, a broad strategy for study locations is recommended that includes computer database searches, hand searches in important journals and conference proceedings, the inspection of reference lists of articles and reviews, and the use of the network of researchers that are active in the relevant area. The last strategy for study location is important to identify and include unpublished studies as well. The method for

locating the studies should be documented in detail including criteria for inclusion or exclusion of studies.

Creation of a Meta-Analytic Data Base

The creation of a meta-analytic data base requires the calculation of effect sizes and the coding of moderator variables. The calculation of effects includes the selection of an effect size index and the transformation of effects of individual studies into a common effect size statistic. Moderators can only be tested if there are enough studies in each subcategory suggested by the moderator analysis. Three types of moderators deserve careful observation: study characteristics, methodological moderators, and theoretical moderators. Study characteristics are typically coded in any meta-analysis (e.g., year of publication, study quality). Methodological moderators are important to test e.g., the validity of different instruments (see e.g., Collins et al., 2004; Stewart & Roth, 2004). Finally, theoretical moderators are derived from theory.

Meta-Analytical Data Analysis

The goal of the meta-analytical data analysis is to establish the overall effect size and to explain variations in reported effect sizes either by sampling error variance (and other study artifacts) or by moderator analysis. The data analysis starts with the aggregation of effect sizes across studies. These effects should be corrected for attenuation (Hunter & Schmidt, 2004). For example, low study reliabilities and range restriction systematically bias effect sizes downwards. Therefore, one should correct for such biases when testing the validity of concepts. Moreover, the aggregated effect size needs further examination in order to test whether or not reported effects are homogeneous across studies. If effect sizes are heterogeneous, which means that there is a significant amount of variation in the size of reported effects, further moderator testing is indicated. The meta-analytic data analysis ends when all of the variance of reported relationships is explained by sampling error variance, which implies that the effect sizes on the subsets of the moderator variable need to be homogeneous as well.

The Hunter and Schmidt (1990) method is widely used and has been shown to deliver accurate estimations of the effect sizes (Hall & Brannick, 2002). The technique, however, has its limitations regarding tests of dependent effect sizes, multivariate effects, and more than one moderator at the same time. For example, the method requires independent effect sizes. However, often researchers want to include a study more than one time in a meta-analysis

e.g., when the construct under investigation consists of more than one dimension. Gleser and Olkin (1994) developed a method for such situations, where reviewers want to meta-analyze-dependent effect sizes. Moreover, meta-analysts need to develop correlation matrices that are established with meta-analytical techniques and that allow for testing the multivariate effect of a set of predictors on entrepreneurial outcomes. Finally, meta-analyses often test more than one single moderator variable. Regression analysis can be used to test whether moderators are confounded and which of the multiple moderators are most important (Lipsey & Wilson, 2001). Thus, future meta-analyses in entrepreneurship research need to apply meta-analytical techniques beyond those described by Hunter and Schmidt (1990).

Interpretation and Integration of Results

The study-level analysis and the high aggregation of characteristics have implications for the interpretation and integration of results. The interpretation of the magnitude of effects is as important as the interpretation of its variance (Lipsey & Wilson, 2001). A frequently used rule of thumb considers effect sizes of $r \leq .10$ as small, $r = .30$ as medium, and $r \geq .50$ as large effects (Cohen, 1977). However, Cohen (1977) did not provide any systematic analysis to justify the rule of thumb. Therefore, the effect should be compared with other effect sizes found in a similar or different research domain. For example, one might compare the effect size of achievement motivation with the one of risk-taking and conclude that the magnitude of the effect size of risk-taking is relatively small. There are other more systematic ways for determining the practical significance of an effect size (compare, e.g., Rosenthal & Rubin, 1982). The magnitude of effect sizes should not be interpreted without careful examination of the variance of effect sizes. The interpretation of meta-analytical results is relatively straightforward if all of the variance can be explained by sampling error variance; in this case the meta-analytical results can be generalized broadly. If effect sizes are heterogeneous, then one needs to know why studies differ.

Even though meta-analysis is well suited for cumulating evidence in a field, scholars must be aware of limitations and critique of this method. Some potential limitations are now addressed.

LIMITATIONS AND CRITIQUE TO META-ANALYSIS

While we argued that the scope of a meta-analysis should be defined as detailed as possible, this advice needs to be modified in many situations. If

the scope is defined too narrowly, studies are really replications, and the meta-analysis will suffer from too few studies that match the criteria for the inclusion. If the scope is defined too broadly, studies will differ on a number of study characteristics. For example, when a meta-analysis on entrepreneurs includes quite different types of participants (owners, starters, CEOs, and key managers), the participants differ in a number of characteristics, such as age or experience. This might cause difficulties to draw clear conclusions from this meta-analysis because the inclusion criteria mix apples and oranges (Johnson & Eagly, 2000). Of course, overgeneralizations occur just as easily in narrative reviews; however, one can actively deal with this problem in a meta-analysis: study characteristics are made explicit (e.g., in a table) and thus, meta-analysis allows for reanalysis based on narrower criteria for inclusion. Moreover, meta-analysis allows to code for different levels of scope and, therefore, to control for the apples and oranges problem. For example, one might calculate effect sizes for owners, starters, CEOs, and managers separately and then compare these effect sizes with an overall effect size that combines owners, starters, CEOs, and managers.

Second, meta-analytical results are just as good or bad as studies included in the analysis. If studies included are flawed on a number of characteristics or, even worse, if there are no good quality studies, resulting effect sizes will hardly reflect the true validity of concepts. If there is enough variation in study characteristics one can statistically control for study quality by coding and examining the effect of quality characteristics on the magnitude of outcomes.

The problem of confounding variables affects not only quality issues but theoretical moderator variables as well. Sometimes, moderator variables are correlated (e.g., age and size of business), and in this case it is difficult to draw strong conclusions about effects. Therefore, meta-analysis should examine the relationships between moderator variables, for example by hierarchical moderator analysis (Hunter & Schmidt, 2004) or by modified weighted least square regression analysis (Lipsey & Wilson, 2001). Thus, a good meta-analysis actively examines potential confounding variables.

Another potential limitation of meta-analytic results is caused by sampling bias and systematic bias due to difficulties in finding studies. This bias is problematic when there is a publication bias in a field (e.g., that null-findings are not publishable) or the meta-analyst systematically selects a certain type of publication (e.g., only “good journals”). Meta-analyses can better deal with sampling bias than narrative reviews because they actively try to access unpublished studies. Therefore, they can estimate whether or not there is a publication bias in the literature. Moreover, it is a good practice to estimate the number of studies with null results needed to reduce

the effect size to insignificance (file save N) (Rosenthal, 1979). However, the file drawer problem is a consistent problem; therefore, the best strategy to deal with it is to be careful in selecting and identifying all studies.

Thus, there are potential limitations to the validity of meta-analysis that need to be minimized by carefully identifying and sampling all studies that are relevant regarding the scope of the study, by statistically analyzing potential confounding variables and by explicitly documenting all decisions and steps involved in the meta-analysis.

META-ANALYSIS AS A TOOL FOR DEVELOPING EVIDENCE-BASED ENTREPRENEURSHIP

Meta-analysis has not been used frequently in entrepreneurship research, but this method had a fundamental impact on other disciplines such as medical research. For example, in medicine meta-analyses have addressed the effects of particular drugs or therapeutic interventions. One can get meta-analytically established information about the risk and the effectiveness of a particular vaccine and use this information to base one's decision about whether or not to use this vaccine. Moreover, based on meta-analytical results one may calculate how many lives would have been saved if a particular drug would have been used (Antman, Lau, Kupelnick, Mosteller, & Chalmers, 1992). Today, the Cochrane Collaboration provides online access to more than 1000 meta-analyses in medicine (<http://www.cochrane.org>). Medical practitioners and researchers (and private persons) can access this database and the updated meta-analytical results and use this information to improve professional decision making.

Following the idea of the Cochrane Collaboration, Frese, Schmidt, Bausch, Rauch, and Kabst (2005) recommended an evidence-based approach for the domain of entrepreneurship. Such an approach requires both empirically sound analysis and theoretical validation of identified relationships. The necessary steps include three major activities (Frese et al., 2005). First, entrepreneurship research need more meta-analyses. The general objective of these analyses is to get evidence on the size of the conceptualized relationships as well as an assessment about the context to which these effects can be generalized. If effect sizes are homogeneous, the results can be generalized throughout the field of entrepreneurship. If effect sizes are heterogeneous, subsequent analyses and original research need to specify the context by performing moderator analyses. A second step of evidence-based best practices is to establish cumulative evidence-based models in

entrepreneurship research. The models have to describe the variables of concern and the models should include all variables that add variance explained in the criterion variable in comparison to simple models. This step allows the field of entrepreneurship to develop strong evidence-based theoretical frameworks. We assume that different models exist for start-up activities of would-be entrepreneurs, for predictors of success, and for prevalence rates of business start-ups. Moreover, there are always contextual influences or moderators in entrepreneurship. Finally, entrepreneurship needs to develop manuals of evidence-based best practices how to intervene in given situations. Once meta-analyses have been done and empirically validated models have been developed, one should use the evidence to write manuals of how to intervene, such as manuals for planning, human resource practices, financial support, and internationalization. Such manuals need to be explicit enough to be useful for practitioners and entrepreneurs and need to be science based. These manuals can be complemented by case studies that explain how the manuals can be used. The manual can be experimentally evaluated. The first step is to test whether companies that use the manuals perform better. The second step is to measure, how much the company conforms to the manuals. If there is no indication that commitment to the manual is superior to other practice interventions, then the manual is not optimal and needs to be revised.

META-ANALYSIS AS A TOOL FOR DEVELOPING THEORY, RESEARCH, AND PRACTICE

Our discussion indicates that the use of meta-analysis provides opportunities for the field of entrepreneurship for explaining phenomena, such as business creation, opportunity recognition, and business success. Meta-analysis can be used to develop entrepreneurship theory, research, and practice recommendations.

Theory Development

There are many areas where the field of entrepreneurship developed knowledge through the use of meta-analysis. These meta-analyses addressed the education of owners (Van der Sluis, Van Praag, & Vijverberg, 2006), formal business plans (Schwenk & Shrader, 1993), innovation (Bausch & Rosenbusch, 2005), internationalization (Bausch & Krist, 2004), entrepreneurial orientation (Rauch, Wiklund, Lumpkin, & Frese, 2005), and

franchising (Combs & Ketchen, 2003). The example of the personality approach to entrepreneurship indicates the usefulness of a meta-analytical approach to entrepreneurship. Five meta-analyses in the domain addressed personality characteristics of entrepreneurs (Collins et al., 2004; Miner & Raju, 2004; Rauch & Frese, 2006; Stewart & Roth, 2004; Zhao, 2004). These efforts indicate that entrepreneurship research is at a stage where it could develop theory by using a meta-analytical approach.

Entrepreneurship areas that have not been addressed by using meta-analysis to our knowledge are, e.g., cognitive approaches, market strategy, entrepreneurial clusters, environmental conditions, cultural factors, size and age issues, differences between different types of businesses (e.g., family business, high-growth businesses), or venture capital decisions. It would also be interesting to test the validity of different types of criterion variables in entrepreneurship research. The validity of the dependent variable is a recurring discussion in entrepreneurship research because each single criterion variable has different problems and errors (cf. e.g., Delmar, 1997; Weinzimmer, Nystrom, & Freeman, 1998). Meta-analysis can contribute to this discussion by analyzing the interrelationships of different types of dependent variables, such as growth, accounting-based numbers, perceived success, and survival and, moreover, by estimating the differential validity regarding the correlations between different sets of predictor variables and different sets of criterion variables. Moreover, entrepreneurship is concerned with business populations as well as with business owners and, therefore, additional meta-analyses need to test theories at different levels of analysis (Davidsson & Wiklund, 2001). For example, business-level strategy has rarely been tested by using meta-analysis (the exception is innovation). It would be interesting to test, e.g., Porter's (1980) generic strategies in entrepreneurship by using meta-analytical methods.

In order to contribute to theory development, meta-analysis needs to test more moderators in entrepreneurship research. All meta-analyses discussed above found heterogeneous effects, indicating that many relationships in entrepreneurship are not direct. However, only a few meta-analyses addressed theoretical moderators (exceptions are, e.g., the meta-analysis by Bausch & Rosenbusch, 2005; Rauch & Frese, 2006; Rauch et al., 2006). For developing entrepreneurship theory, we need more meta-analyses that address theoretical moderators. For example, it is well established that formal business planning is related to success (Schwenk & Shrader, 1993). However, the planning–success relationship is heterogeneous (Schwenk & Shrader, 1993) indicating that moderators impact on the size of the relationship. Therefore, entrepreneurship research needs to know more about

the situations, where planning–success relationships are high or low. Another useful example is the internationalization–success relationship. There is a theoretical discussion whether internationalization success is an incremental process (Johanson & Vahlne, 2003) or whether there is an advantage to newness in the internationalization process (Autio, Sapienza, & Almeida, 2000). One meta-analysis has addressed such hypothesis (Bausch & Krist, 2004) and found that younger firms were more successful in internationalization than older firms. In this way, meta-analysis can usefully contribute to theory development in entrepreneurship research. Many approaches in entrepreneurship hypothesize contingency models and, therefore, meta-analyses need to address the hypothesized moderators.

Entrepreneurship is an interdisciplinary field that uses multiple predictors to explain the phenomenon of entrepreneurship. Therefore, meta-analyses need to test cumulative models that suggest that strategy, environmental conditions, competencies, and organizational variables all affect entrepreneurial outcomes (Baum, 1995; Sandberg & Hofer, 1987; Rauch & Frese, 2000). Moreover, it would be useful to test which predictors explain incremental variance beyond the variance explained by personality variables.

Finally, meta-analysis can also address changes over time, for example by coding for the development of the business or the year in which the data were collected (Taras & Steel, 2005). Thus, meta-analysis can be used to analyze process issues in entrepreneurship.

Research

Meta-analysis may force researchers to do more rigorous research in entrepreneurship by identifying weaknesses in research and publication practices and by opening new avenues in research. Meta-analyses can test for moderator effects of study characteristics (e.g., published versus unpublished) and for methodological moderators (e.g., objective versus projective measurements). In this way, meta-analysis is able to detect invalid predictors, inadequate measurements, and publication bias. Moreover, meta-analysis opens new areas for research. For example, the meta-analysis by Schwenk and Shrader (1993) found heterogeneous relationships between formal planning and success. Thus, future studies need to identify moderators that impact on planning–success relationships.

Since entrepreneurship is a relatively new field, there are often not enough studies in some areas of entrepreneurship research. This indicates that entrepreneurship research needs more constructive replication studies that show when and how hypothesized relationships hold (Davidsson, 2004). Once

enough replication studies are done, subsequent meta-analysis can establish more information about the size and the generalizability of the relationships.

Moreover, improved publication practices and access to data should support the use of meta-analysis to develop research and theory in entrepreneurship. According to our experiences, roughly a third of the published studies relevant for a specific meta-analysis do not provide the necessary statistics required for transforming the study results into effect sizes. This is not just true of descriptive studies but, surprisingly, also of studies using multivariate analyses, such as multiple regressions. Meta-analyses require a description of the sample and clear statistics on sample size, means, standard deviations, and intercorrelations of all variables (including controls). This information is sufficient for most of the meta-analytical methods discussed in the literature. Doing more meta-analyses in entrepreneurship research should be supported by improving access to data from published and unpublished studies. This can be achieved by developing standards for archiving the data of empirical research and to allow for outside use of the data by other scientist in the field. The Inter-University Consortium for Political and Social Research (ICPSR) at the University of Michigan developed some useful guidelines for data archiving (ICPSR, 2000) and in entrepreneurship research the Global Entrepreneurship Monitor (Reynolds, Bygrave, Autio, Cox, & Hay, 2002) is committed to such standards. More such data archives would allow to include unpublished technical reports and published studies that did not present the required statistics and to reanalyze data to include variables that have not been reported in the original publication.

Practice Recommendations

The empirical basis for practice recommendations in entrepreneurship can often be strengthened (Davidsson, 2004). Frequently, what is considered best practices may be a result of fads. Meta-analysis does not only contribute to research and theory development but results additionally in evidence-based practice recommendations (Frese et al., 2005). Examples of practice recommendations of meta-analyses are numerous. First, practice recommendations can guide policy makers. For example, the German government introduced in 1994 the so-called IchAG. The goal of the program was to support entrepreneurship. One of the most important criteria for attending the program was a formal registration of unemployment. An evidence-based approach can provide valid advice whether unemployment is a valid predictor of a successful business start-up. Meta-analytical results of today would have suggested to use, at least additionally, education, achievement

motivation, and innovativeness as criteria for attending the program. Second, meta-analysis results can guide training and education. Entrepreneurship curricula can be developed based on the empirical evidence provided by meta-analysis. For example, the extensive use of formal business planning courses in entrepreneurship curricula may reflect an overestimation of its effectiveness as the mean relationship between business planning and success is only moderate ($d = 0.42$; Schwenk & Shrader, 1993). Moreover, analyses should show, which type of formal business planning is related to which type of dependent variables. Third, meta-analyses can be used by consultants and by business angels. All these practice recommendations can be put together in a synthetic program (e.g., for a business school). For example, the importance of a business plan for success is known and can be compared to the effect size of other predictors of success. Thus, entrepreneurship research is able to provide synthetic evidence-based practice recommendations.

CONCLUSION

Cumulating empirical evidence is central to entrepreneurship in order to verify the status of concepts discussed in the literature. In entrepreneurship research, meta-analysis has been mainly used for determining the overall relationship between predictors and entrepreneurial outcomes. This chapter has advanced to use meta-analysis for theory development and for developing practice recommendations as well. The personality approach is presented as an example of how to use meta-analysis to establish empirical evidence of concepts in entrepreneurship. In contrast to narrative reviews, meta-analysis showed that personality characteristics, such as need for achievement, are useful to distinguish entrepreneurs from non-entrepreneurs and are positively related to business performance. The authors believe that more meta-analyses should be used to advance the field of entrepreneurship by estimating the validity of concepts and by systematically addressing theoretical moderators, potential confounds, and by comparing competing theories. Thus, meta-analysis can be used fruitfully to establish shared knowledge in the field of entrepreneurship including its theoretical and practical consequences.

NOTE

1. We report two frequently used effect size indexes: the standardized mean difference “ d ” and the correlation coefficient “ r ”.

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AN EMPIRICAL TEST OF SYSTEMATIC PROCESS DIFFERENCES BETWEEN THE BURSTING OF INNOVATIVE VENTURE INITIATIVES AND THE SHAPING FORCES OF IMITATIVE VENTURE INITIATIVES

Mikael Samuelsson

Why is it that some new ventures successfully survive the business start-up process, transforming from a venture opportunity into a new venture and others not? Any answer to such a question will be of practical value to at least some of the approximate 283 million people involved in entrepreneurial activity around the world (Reynolds, Bygrave, Autio, Cox, & Hay, 2002). In addition, large-scale systematic research focusing on the early lives of new ventures extends our knowledge inside the early and important sequence of the entrepreneurial process (Bamford, Dean, & McDougall, 1999; Davidsson & Wiklund, 2001; Venkataraman, 1997; Shane & Venkataraman, 2000; Shane, 2003). Extending theory and research brings new challenges to our field. First, extending knowledge into the nascent stages of the

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entrepreneurial process requires new theories or extensions of established theories into a new empirical space (cf. Davidsson, 2004; Shane, 2003). Second, testing theory in nascent stages of the entrepreneurial process requires new research designs enabling real-time data collection in uncharted areas of the entrepreneurial process only preceded by in-depth case studies and historic reviews (Davidsson & Wiklund, 2001). Third, focusing on process also requires a move from cross-sectional data analysis to more complex statistical analysis methods capable of handling both individual variations in initial status and in development across time (Aldrich & Baker, 1997; Chandler & Lyon, 2001; Samuelsson, 2004).

Entrepreneurship theory consists of a set of communities focusing on different, rather isolated aspects of the entrepreneurial process, such as venture opportunity recognition, issues related to resources, high tech venture capital, etc. just to give a few examples (cf. Gartner, 2001). This is a necessary development in a young and maturing field of research within the social sciences. Equally important in a new field are more general attempts to formulate more general theories of entrepreneurship, such as: Shane's (2003) *A general theory of entrepreneurship*, Shane and Venkataraman's (2000) domain of entrepreneurship and Per Davidsson's (2000) conceptual model of entrepreneurship. A central theme in these is a strong focus on the venture opportunity and the nexus between venture opportunities and enterprising actors. Such a theory, however, requires both an ability to isolate a phenomenon in time and space and to develop a boundary around the phenomena as well as an empirical confirmation. This research is an attempt to extend this discussion through the following steps: First, I derive a business start-up model based on venture opportunity variation; second, I discuss systematic variation in the nascent business start-up as a consequence of venture opportunity variation; and a final aim is to empirically test such a model in a population sample of new venture opportunities with state-of-the-art statistical methods. Given some of the unique features in this research, I aim to contribute to entrepreneurship theory and research in three distinct areas:

1. Extending the conceptual discussion into the very early stages of a new venture's life through a discussion about venture opportunity variation as well as variation in exploitation and exploration processes of the nascent start-up processes.
2. Utilizing and testing research designs that allow us to identify and follow venture opportunities from discovery across time.
3. Creating knowledge by utilizing state-of-the-art longitudinal research methods and analysis techniques such as longitudinal growth modeling (LGM).

Concentrating on the nascent stages of the entrepreneurial process is important because it is suggested that the primary locus of a venture exists in the selection of goals and domains, with the most consequential act of domain selection being made at the time of its founding (Bamford, Dean, & McDougal, 1999; Carter, Williams, & Reynolds, 1997; Child, 1972; Weick, 1979). A fundamental proposition is that a venture is imprinted at the time of founding and that this imprinting has lasting effects on the subsequent strategy (Boeker, 1988, 1989), structure (Stinchcombe, 1965), and performance (Bamford et al., 1999; Cooper, Gimeno-Gascon, & Woo, 1994; Romanelli, 1989) of those ventures. One striking problem with prior efforts is their focus on new firms, 1–8 years old, rather than nascent venture initiatives in the process of creating value from the venture opportunities (cf. Bamford et al., 1999).

The nascent stages of the entrepreneurial process could be divided into two partly overlapping sequences, venture opportunity recognition, and venture opportunity exploitation or exploration (cf. Davidsson, 2003; March, 1991; Sarasvathy, 2001). The initial stage includes venture opportunity recognition, in which enterprising actors make a conjecture about resource value now and in the future (cf. Casson, 1982) and, second, the nascent exploitation or exploration process which, captures the flavor of the sometimes chaotic and disorderly founding process involving those events and activities that lead to and influence the creation of the new venture (March, 1991). This process involves actors' perception of the venture opportunity that are met by acquisition and management of resources (land, labor, capital, and information) in order to exploit or explore the opportunity into a wealth-creating entity (Teece, Pisano, & Shuen, 1997). Enterprising actors do not instantaneously create new ventures to realize value from the opportunities they identify; rather, they create new ventures through a series of actions in a start-up process – obtaining inputs, conducting product development, hiring employees, seeking funds, and gathering information from customers – undertaken to different degrees, in different order, and at different points in time by different actors (Gartner, 1985) given what type of venture opportunity the actors decide to exploit or explore (cf. Sarasvathy, 2001).

An opportunity variation hypothesis is founded on the assumption that an economy is permanently characterized by heterogeneity and the forces of creative and optimizing economic change (cf. Davidsson, 2003). Two main types of venture opportunities are important in this discussion (cf. Aldrich, 1999; Samuelsson, 2004). The first is based on economic change that expresses a creative aspect (Schumpeter, 1934), which if enacted on, initiates

developmental processes under uncertainty (Knight, 1921; Sarasvathy, 2001) and exploration processes (cf. March, 1991). On the other hand, there are changes that express an optimizing aspect (Kirzner, 1973) which, if enacted on, originates equilibrium adjustments under risk (Hayek, 1945; Kirzner, 1973; Knight, 1921; Mises, 1949; Rosen, 1983) and exploitation processes according to March (1991). The latter could be referred to the Schumpeterian tradition of innovation and is here called innovative and the former is analogous with Kirzner's (1973) imitation based on arbitrage, sometimes also called reproducing venture opportunities (cf. Aldrich, 1999). In reality, however, a dichotomy is seldom seen as clear as in theory, but for theory testing it is possible to regard venture opportunity variation as such. Given that an economy consists of human actors heterogeneous with respect to experience, skills, and cognitive capacity (Cohen & Levinthal, 1990; Conner & Prahalad, 1996) as well as diverse motivations (Birley & Westhead, 1994), it is possible to assume that the universe of opportunities is not the same for all individuals (Eckhardt & Shane, 2003; Shane, 2001).

Venture opportunity variation also has implications for the subsequent business start-up process because it (1) is the outcome of a supply and demand combination, which is the first conjecture of the new venture and (2) generates two types of indeterminisms: uncertainty and risk (Knight, 1921). Innovative venture opportunities are a unique manifestation of creative change in supply and demand where the outcome of the exploration process is uncertain to enterprising actors (Arrow, 1962; Schumpeter, 1934). Imitative venture opportunities, in contrast, are based on optimizing change in supply and demand where the outcome of the exploitation process is based on risk with a known underlying distribution, which makes it possible to calculate the outcome of the exploitation process (cf. Sarasvathy, 2001). Conceptually, variation in the start-up process closely follows Sarasvathy's (2001) theory of effectuation and causation. Based on experiments, Sarasvathy argues that effectuation could be viewed as an iterative effect-based theory of decision making under uncertainty and causation as a decision making under risk. However, little is said about when the former or the latter is more efficient in addition to lack of systematic empirical testing of the theory. March (1991) discusses the same concepts, however, in organizational decision making and learning. In his words, exploration concerns uncertainty and exploitation concerns risk taking.

In sum, theory suggests two types of venture opportunities – innovative and imitative, which in turn suggests two main types of start-up processes: exploration (effectuation) and exploitation (causation). Reviewing the literature also reveals that, despite a strong conceptual position, empirical

confirmation of venture opportunity variation as well as variation in the nascent business start-up process is mostly lacking or consists of anecdotal evidence (Eckhardt & Shane, 2003). Thus, it is possible to ask and seek to empirically confirm whether:

1. The start-up process varies as a function of venture opportunity variation?
2. Variation in the start-up process is predicted by different factors during different sequences in the process due to venture opportunity variation.

Despite, the by now well-known, creative destruction, formal models of embryonic economic growth seems to offer little to reflect or model dual processes of start-up processes (cf. Moran & Ghoshal, 1999). Nelson (1994, p. 26) writes: “the new formal models continuous in the spirit of the older ones in treating the actions of firms as determined by the environment they are in, and ignoring anything like Schumpeter’s ‘entrepreneurship’” and, in addition, the venture opportunity is often taken for granted without further considerations of its meaning or implication for theory or empirical analysis. Assume the following scenario: one random sample of venture opportunities consist of both innovative and imitative venture opportunities, one explaining factor has a positive impact on progress for innovative venture opportunities and a negative impact on imitative venture opportunities leading to confounding statistical results where the effect could cancel out each other.

Another problem pointed out in recent reviews explicitly states a lack of systematic studies of the venturing process as well as a lack of consistency between research design, unit of analysis, and longitudinal statistical methods (cf. Chandler & Lyon, 2001; Davidsson & Wiklund, 2001). This research is an attempt to address these questions and inconsistencies in a formal model built around the Schumpeterian stands of innovations and the neoclassical stand of optimization. The model is then empirically tested in the Swedish Panel Study of Entrepreneurial Dynamics (PSED) data. The research design is developed to provide population data on how new ventures come into existence following a random sample of 622 venture opportunities throughout the start-up process. State-of-the-art longitudinal statistical methods are utilized including both time varying and time invarying variables.

THEORY DEVELOPMENT

How general can a “general” theory of entrepreneurship be? Abstraction is a necessity but is it possible to include venture opportunity variation in a general theory of entrepreneurship building on two contrasting perspectives

such as equilibrium economics and disequilibrium economics. Two important boundaries need to be explicated. First, defining entrepreneurship as the creation of new economic activity includes both the creation of new means – ends (cf. Schumpeter, 1934) – as well as optimizing within known means – ends frameworks (cf. Kirzner, 1997). Second, such a theory includes an opportunity – actor nexus because it is the first tangible or intangible evidence of existing venture opportunities. Formal models of entrepreneurship often start with a person and at some point in time an exchange of persons with firms take place which is confusing because both levels of analysis and outcome are mixed with each other. Apparently, there is no such thing as entrepreneurship without actors, but if we want to create knowledge about the creation of economic activity, we need to frame our boundary around the nascent initiative instead of single actors and/or teams of actors because value can only be assessed in relation to the costs of services withdrawn. Analogous to this is, for example, the theory of firm and the theory of organizations with boundaries well beyond single actors or groups of actors. Another factor behind a venture-based theory of entrepreneurship comes from empirical evidence from the Swedish PSED, which suggests that approximately 16% ($n = 97$) nascent entrepreneurs are exchanged during the start-up process. Formal models of entrepreneurship could therefore start with the nexus of venture opportunities and enterprising actors as suggested by Shane (2003) or with resources as suggested by Davidsson (2000) and progress forward in the entrepreneurial process. Entrepreneurship models built around the economic activity itself needs to be dynamic allowing different outcomes and feedback loops because resource combinations alter our perception of value and diffuses information, which may lead to additional resource combinations (Hayek, 1945).

The proposed venture level model of entrepreneurship is conceptually different from most other entrepreneurship models that often start with a person or a firm (cf. Davidsson & Wiklund, 2001), and it also has its starting point in the nascent stages of the entrepreneurial process. It could, as in this case, start in the nascent stages of the entrepreneurial process and seek to model venture opportunity recognition and progress in the nascent venturing process as one particular outcome. It could, however, also start in established organizations and explain the creation of new economic activity across time with different outcomes.

The model starts with resources and resource combinations. We conceive of resources in terms of supply and the environment in terms of demand because change in supply and demand is a necessary condition for individuals to recognize a venture opportunity (Schumpeter, 1934). The venture

opportunity is based on individual actors conjecture that resources are not put at their best use. Ownership or possession of resources is not a necessary condition for venture opportunity recognition to take place (cf. [Stevenson & Jarillo, 1990](#)). Instead, venture opportunities are viewed as conjectures based on information of resources value now and in the future, which is based on supply and demand combinations, as illustrated in [Fig. 1](#) by resource and environmental combinations (relationship *a* and *d*).

Venture opportunities need to be exploited if they are of an imitative character and explored if they are of an innovative character in order to have an economic impact. Entrepreneurship is therefore seen as a process that evolves across time and venture opportunity recognition as well as exploitation and exploration is seen as overlapping processes (cf. [Bhave, 1994](#); [de Koning, 2003](#)). The literature includes a number of names for this process such as: “opportunity discovery,” “idea generation,” “opportunity formation,” “opportunity identification,” “opportunity detection,” and “opportunity refinement” ([Bhave, 1994](#); [Christensen & Peterson, 1990](#); [Christensen, Madsen, & Peterson, 1994](#); [de Koning, 1999a, b](#); [Gaglio, 1997](#); [Hills, 1995](#); [Kaish & Gilad, 1991](#); [Long & McMullan, 1984](#); [Shane & Venkataraman, 2000](#)). One potential problem found in the review and in the models presented is that they focus on actors, they do not regard venture opportunity variation (except [Bhave, 1994](#), who discusses this in terms of novelty) and they do not allow different outcomes across time. One common

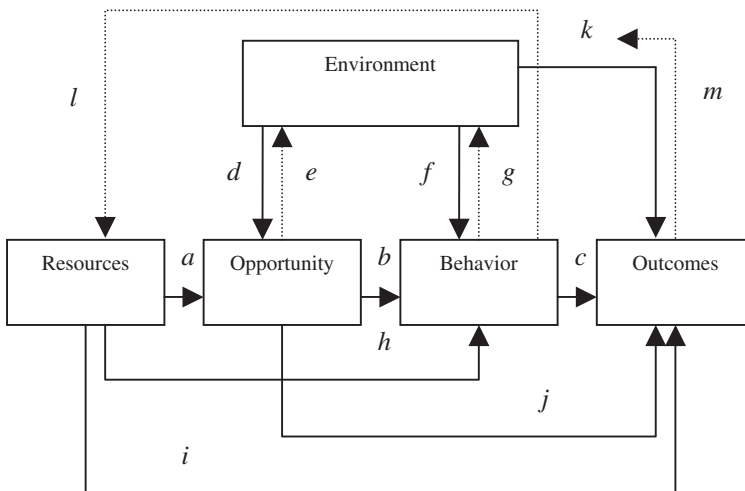


Fig. 1. A Venture Level of Entrepreneurship (based on [Davidsson, 2000, p. 6](#)).

theme, however, which supports this study, is an explicit focus on the venture opportunity as “the” first evidence of a new venture. *An opportunity-based perspective suggests that the venture opportunity is an essential milestone in the entrepreneurial process because it constitutes the first conceptual evidence of the new economic activity and as such, the first boundary condition.* One problem, however, is that we are not certain of whether it is a productive venture opportunity with capacity to generate value or if it is a false venture opportunity without capacity to generate value (cf. Moran & Ghoshal, 1999). Instead, venture initiative is used in order to delimitate and set boundaries around the evolving entrepreneurial process.

The opportunity in part determines what type of environment the initiative operates in (*e*) and the external environment in turn not only affects the opportunity, but also its further development (*d*). The opportunity further influences what recognition and exploitation behaviors are undertaken and may have a direct influence on the outcomes of the exploitation and exploration process (*j*). Recognition and behaviors are influenced by the initial resource endowment (*h*) and by reactions from the environment (*f*) that has been enacted (*g*). Behaviors are undertaken in the interaction with the external environment (*f*, *g*), which further feed back resources in the form of acquisition of knowledge and tangible resources (*l*). *This part of the model concerns the nascent venturing process and is also viewed as an essential part of the entrepreneurial process because all ventures need to pass this process in order to create value from the venture opportunity.* Outcomes are conceived as contingent not only on the behaviors (*e*) and characteristics of the external environment (*k*), but also on resources and the characteristics of the opportunity (*j*). The outcome may also feed back on the antecedents of the opportunity (*m*) (Davidsson, 2000). The aim of this study is to explain venture opportunity variation and progress in the entrepreneurial process, here captured by behaviors and explained by resources and the environment.

This model can be compared to other attempts to map the early stages of the entrepreneurial process. Various flow models exist at various levels of detail (Carter, Gartner, & Reynolds, 1996; Gartner, 1985; Moore, 1986; Reynolds & White, 1993; Vesper, 1980); life cycle views of venture growth and decline (Churchill & Lewis, 1983; Kazanjian, 1988; Kazanjian & Drazin, 1990) and network models of the start-up process (Larsson & Starr, 1993). In the literature, this process is also referred to as organizational creation (Carter et al., 1996); organizational emergence (Gartner, Bird, & Starr, 1992); the preorganization (Katz & Gartner, 1988; Hansen, 1990); the organization in vitro (Hansen & Wortman, 1989); prelaunch (McMullan & Long, 1990); gestation (Reynolds & Miller, 1992); entrepreneurial process

(Reynolds & White, 1993); start-up (Van de Ven, Venkataraman, Polley, & Garud, 1989; Vesper, 1990; Reynolds & White, 1993); and entrepreneurial venture creation (Bhave, 1994).

Comparing the venture level model of entrepreneurship with prior efforts, it is evident that the proposed model is conceptually strong and consistent with entrepreneurship as the creation of new economic activity. Instead of focusing on mode of exploitation or the creation of organizations this model focusses on the creation of a new economic activity per se. This is possible due to the explicit focus on the venture opportunity and its central position in the entrepreneurial process. The proposed model also encompasses venture opportunity variation and its implications for the business start-up process, here viewed as a gestation behavior process in which enterprising actors take advantage of resources combinations through a behavioral process seeking to create value.

VARIATION IN PROGRESS IN THE BUSINESS START-UP PROCESS AS A FUNCTION OF VENTURE OPPORTUNITY VARIATION

The distinction between creative and optimizing change points at the theoretical distinction between two kinds of indeterminism, uncertainty and risk. Uncertainty arises from the phenomenon's inherent non-predictability, expressing innovative venture opportunities, which are analogous to the laws of quantum mechanics (Khalil, 1997), and in economics, Knight's (1921) notion of uncertainty. The properties of the subject are unknown and exploring such a venture opportunity means going into the unknown. Future states are not given facts because actors are innovative and creative. The creative aspects of the opportunity make the agent uncertain about the magnitude of "self-ability" when ability undergoes developmental change. Such a self-defining process is the basis in Simon's (1976) "procedural rationality," which lately has been discussed in terms of a rudimentary theory of effectuation (cf. Sarasvathy, 2001).

If enterprising actors believe they were dealing with a relatively unpredictable phenomenon such as exploring innovative venture opportunities that originate uncertainty, they will try to gather information through an experimental/iterative learning process aimed at first discovering the underlying distribution of the future (cf. Sarasvathy, 2001). This process involves the creation of new market transactions in situations without a common knowledge base that can support and enhance the exploration process. Exploring

actors go through a learning process in which they define and create the new product–market arena (cf. Arrow, 1974). This process suffers from environmental constraints such as “liability of newness” (Stinchcombe, 1965). In situations like this, more gestation behaviors are needed to make the new venture reliable and increase legitimacy with important stakeholders because there is nothing to compare with (Hannan & Freeman, 1984; Sarasvathy, 2001). This class of venture opportunities are what Schumpeter (1947, p. 153) refers to as the “creative response – that is, something that is outside the range of existing practice”. It is both an unpredictable and discontinuous process, which always includes entrepreneurial activity.

Innovations in general are not independently motivated under the current incentive regime, actors exploring innovative venture opportunities need to change and even perhaps develop an entirely new market and change the prevailing institutional setting (cf. Schumpeter, 1947). Innovative venture opportunities can be motivated but are not likely to occur because they depend on some additional deployment, such as a new sales organization, some additional technology, or plain knowledge about how to educate the customer to accept an innovative offering. Hence, such changes are unlikely to be induced automatically by the prevailing institutional setting, rather they are more likely to be systematically discouraged, given the existing distribution of resources, rights, and individual perceptions and the way in which these resources are combined at the time (Moran & Ghoshal, 1999). March (1991) discusses this under the term exploration. In novel situations, exploration is more efficient because prior knowledge is non-existent.

The other kind of indeterminism, risk, arises because of actors’ limited skill of computation and information processing. This indeterminism, characterizing market equilibrium dynamics, is at least heuristically captured by chaos theory, and in economics, by Knight’s (1921) notion of risk, i.e., when the different plans of individuals are mutually compatible and it would be possible to calculate the odds of surviving (cf. Hayek, 1945). Risk reduces the future into facts in a world of certainty. For example, if we had full information and processing capacity it would be possible to calculate what a butterfly somewhere in the Atlantic causes in terms of weather fluctuations in the US. However, such facts are typically not perfectly available to humans because they express limited information, which makes us to formulate only chance probability (risk) about their occurrence (Khalil, 1997). Simon (1976) discusses this in terms of “bounded rationality”. Bounded rationality makes rule-following behavior more efficient on average than a case-by-case extensive investigation because information is available that makes it possible to calculate the outcome of an action.

If actors believe they are dealing with a measurable or relatively predictable future (risk), they will tend to do some systematic information gathering and invest some effort on a reasonable analysis of that information, within certain bounds. Exploiting imitative venture opportunities involves existing market transactions in comparison to innovative venture opportunities that create the new market transactions (Arrow, 1974). Population knowledge concerning products and markets is widely available and the exploitation process depends on the exploiting actors' ability to make more or less mechanical calculations in response to a given set of alternatives (Baumol, 1993). Hence, imitative venture opportunities will suffer less from "liability of newness" and rule-following behavior will be more efficient on average (Stinchcombe, 1965).

Shane and Venkataraman (2000) and Shane (2001) state that most discoveries of opportunities originate from an entrepreneur's prior knowledge and are pursued inside that knowledge area indicating that most people act and form goals inside a known supply and demand framework. This is also supported in experiments of normative models showing that actors in general prefer the "risky or known distribution" to "uncertain or unknown distributions" (Aldrich & Martinez, 2001; Ellsberg, 1961). Actors' rationality is bounded by cognitive limitations such as physiological constraints on computational capacity (e.g. Payne, Bettman, & Johnson, 1993) and psychological limitations such as biases and fallacies (e.g. Bar-Hillel, 1980; Tversky & Kahneman, 1982). Historically, the asymmetry between innovative and imitative venture opportunities has been hidden from entrepreneurship research because researchers have overestimated the innovating capacity among people (Aldrich & Martinez, 2001). Given the existence of two types of indeterminism which suggests two types of venture opportunities and given that most empirical research neglect this fact there are reasons to formulate a general hypothesis:

Hypothesis 1. Exploring innovative venture opportunities is systematically different from exploiting imitative venture opportunities.

SYSTEMATIC VARIATION IN THE BUSINESS START-UP PROCESS PREDICTED BY DIFFERENT FACTORS DURING DIFFERENT SEQUENCES IN THE PROCESS DUE TO VENTURE OPPORTUNITY VARIATION

This section discusses how venture opportunity variation also has implications for how and when different predictors influence the nascent venturing

process. Davidsson (2003) argues for a comprehensive venture level longitudinal model of the entrepreneurial process including the venture opportunity, resources, environment, and outcome. Following the model proposed by Davidsson, it is possible to argue that progress in the nascent start-up process may be explained by different background variables, such as resources, and factors in the environment, across time due to venture opportunity variation.

RESOURCES

Resources are defined as all tangible and intangible assets committed to or available for the recognition as well as for exploitation and exploration of new venture opportunities (cf. Barney, 1991; Daft, 1983; Shrader & Simon, 1997). Resources are often divided into financial-, physical-, human-, and organizational-capital (Ansoff, 1965; Barney, 1991, 1997; Pride, Hughes, & Kapoor, 1993; Dollinger, 1995). Greene and her colleagues add social capital to that list (Greene, Brush, & Myra, 1999; see also Chandler & Hanks, 1994). Recent work, however, has placed greater emphasis on the properties of resources, and in particular distinguishes between more tangible, “input resources” (e.g. people, machinery, financial capital) and knowledge-based resources (Galunic & Rodan, 1998; Kogut & Zander, 1992; Nonaka & Takeuchi, 1995; Teece et al., 1997). Knowledge-based resources refer to the ways in which more tangible input resources are manipulated and transformed to add value (Teece et al., 1997, p. 509). Knowledge-based resources may amplify the value of input resources and how they relate to the opportunity exploitation and exploration process. The most persistent work in this area centers on how human and social capital provided by the venture founder(s) is an important contributor and designer in the development of the venture (Cooper et al., 1994) and as a method of obtaining additional resources through social networks.

Human capital embraces the acquired knowledge, skills, and capabilities that enable actors to sustain competition and act in new ways. Prior research has established a link between human capital, in the form of the experience and education that people acquire during their life course, and progress in the business start-up process as well as subsequent venture performance. (Coleman, 1987; Nahapiet & Ghoshal, 1998). Perhaps the most persistent theme in this area centers on the proposition that there are two main types of knowledge, tacit and codified knowledge (Nahapiet & Ghoshal, 1998). It is possible to distinguish tacit knowledge in terms of its incommunicability; to what extent knowledge is or is not codifiable (Galunic & Rodan, 1998).

Tacit knowledge is here viewed as the capacity to store and systematically recall informational inputs; in this case, as they relate to the recognition, exploitation, and exploration of venture opportunities. Tacit knowledge aids in the process of bringing together diverse basic inputs and specialized areas of knowledge and bundling them to perform a productive undertaking in which accumulation is a result in itself (Dosi, 1982; Grant, 1996). Tacit knowledge can be shared among people but not easily articulated (Polyani, 1963). The most likely sources of tacit knowledge are previous work experience (Vesper, 1990) and business start-up experience (Brüderl & Preisendörfer, 1998; Carroll & Mosakowski, 1987; Schoonhoven et al., 1990).

For innovative venture opportunities tacitness is a necessity as well as a basis for competitive advantage (Barney, 1997; Fiet, 1996; Reed & DeFillipi, 1990; Shane, 2001). Tacit knowledge that is difficult to codify is likely to be difficult to detect and imitate. It will therefore be more difficult for someone to identify it as a potential resource and how it can be explored in novel ways. However, when such a discovery takes place, novel combinations of resources are more likely where tacitness is high (Galunic & Rodan, 1998). When no blueprint is available exploring actors become more efficient as experience is gained (Teece, 1998). Tacit knowledge improves individuals' performance in the early stages of the innovative venture opportunity exploration process because it enables actors to make new resource combinations and navigating through situations where no predecessor exists (cf. Shane, 2001).

Tacit knowledge, however, is also important, but perhaps in a different way, in the start-up process for imitative venture opportunities because this process involves existing market transactions in comparison to innovative venture opportunities that create new market transactions (Arrow, 1974). Population knowledge concerning products and markets is widely available and the exploitation process depends on the exploiting actors' ability to make more or less mechanical calculations in response to a given set of alternatives (Baumol, 1993). Hence, imitative venture opportunities will suffer less from "liability of newness" (Stinchcombe, 1965) and rule-following behavior will on average be more efficient. Tacit knowledge in the form of industry experience is helpful to enterprising actors in the latter stages of the nascent process because it provides knowledge about customers and suppliers, as well as social contacts with important stakeholders (Gimeno, Folta, Cooper, & Woo, 1997; Van de Ven et al., 1989).

Business start-up experience influences the ability of the founder(s) to successfully establish new ventures because much of the knowledge that is necessary for funding a new venture – how to lead and hire people, how

to manage relationships with the right stakeholders, how to attract and retain customers – are learned by doing (Carroll & Mosakowski, 1987; Schoonhoven et al., 1990). The knowledge-based argument suggests that tacit knowledge (in the form of industry and start-up experience) has a positive impact continuously for innovative venture opportunities and in the later stages of the start-up process for both innovative venture opportunities and imitative venture opportunities. Theory indicates that resources play a significant role in the nascent start-up process both for innovative and imitative venture opportunities but venture opportunity variation also suggests that the resources role would be different given the opportunity for enterprising actors to exploit or explore. Given the exploratory setting it is possible to formulate the following hypothesis:

Hypothesis 2. The impact of tacit knowledge (in the form of start-up experience and industry experience) on progress in the nascent start-up process is systematically different for innovative venture opportunities compared to imitative venture opportunities.

Ideally, codified knowledge in the form of a formal education would be valuable because it consists of basic scientific and analytical principles that actors would use to develop new technologies. A higher education can also be viewed as a complementary investment in new knowledge, which might be helpful in marshaling and managing resources during the later stages of the nascent start-up process (Teece, 1998; Teece et al., 1997). An education may improve enterprising actors' information processing skills, and enhance actors' capacity to access and assess venture-specific information concerning the future (Fiet & Samuelsson, 2000).

Relating this discussion to venture opportunity variation, it is possible to view exchange and combinations of tacit and codified knowledge as a way to increase new knowledge often required in the nascent start-up process, especially in innovative processes (cf. Nahapiet & Ghoshal, 1998). Hence, it is possible to argue that tacit and codified knowledge will be sequentially important for different stages of the start-up process. In the early stages, tacit knowledge is essential because the innovative venture opportunity resides in tacit knowledge. However, actors also need to create legitimacy for their new venture. Codified knowledge in the form of formal education adds resources to the later stages of the nascent venturing process for innovative venture opportunities because knowledge could be developed based on the tacit knowledge acquired through industry and firm formation experience as well as codified knowledge acquired by a formal higher education.

Imitative venture opportunities, on the other hand, may not be an attractive choice to individuals with a higher education because: (a) they have the analytical skills needed to calculate the outcome of that effort and (b) the benefits coming from such an opportunity is lower than that required by the individual due to high costs of education and future expectations of that education. Venture opportunity variation and knowledge-based views suggest that codified knowledge (in the form of formal education) may have a sequential impact on the nascent venture opportunity exploitation process as well as differ in its value to the process due to venture opportunity variation.

Hypothesis 3. The impact of codified knowledge (in the form of a formal education) on progress in the nascent start-up process is systematically different for innovative venture opportunities compared to imitative venture opportunities.

Human capital as described above is often contrasted with social capital. Human capital is inherent in education and experience that people acquire over their lifetime and is based on the actors' mental schema. Social capital, on the other hand, is based on the actors' social surroundings and gives a person access to valued assets such as "information, referrals, resources, and support" (Ibarra, 1997, p. 91). An investment in social relations may enhance access to embedded resources to enhance expected returns of instrumental or expressive actions in the nascent venturing process (Lin, 1999).

The central proposition of social capital theory is that the networks of relationships constitute valuable resources for the conduct of social affairs, providing their members with the "collectively owned capital, a credential which entitles them to credit in the various senses of the world" (Bourdieu, 1986, p. 249). Much of this capital is embedded within networks of mutual acquaintance and recognition such as friendship or from the more institutionally guaranteed rights derived from memberships in a family, a class, or a school (Bourdieu, 1986). Other resources are available through social connections, for example through "weak ties" (Granovetter, 1973) and "friends of friends" (Boissevain, 1974). One often-posed argument is that network members can gain privileged access to information and opportunities through their social capital. However, actors may also receive significant social capital in the form of social status, reputation, and trust derived from membership in specific networks (Bourdieu, 1986; Burt, 1992; D'Aveni & Kesner, 1993).

Nahapiet and Ghoshal (1998, p. 245) define the social network as "the sum of the actual and potential resources embedded within, available

through, and derived from the network of relationships possessed by an individual or social unit". With this definition, social capital comprises both the network and the assets that may be mobilized through that network (cf. Bourdieu, 1986; Burt, 1992). This adds an instrumental aspect of social capital that resides not only in the focal person but also in accumulation throughout a social network.

Four different types or functions of social capital influence the business start-up process (Brüderl & Preisendörfer, 1998; Powell & Smith-Doerr, 1994): (1) emotional capital to reinforce and support the aspiring entrepreneurs self-confidence; (2) social capital as an important channel for gaining access to information; (3) gaining access to customers and suppliers; and (4) to broaden the financial and physical resources of the new venture. These four functions may be reduced to two main dimensions of social capital – one emotional and one instrumental. Emotional social capital provides emotional support that socially reinforces the actor's actions and builds self-confidence (Foxall, 1997; Johannisson, 1986, 1995). The instrumental mechanism in social capital includes information, customers, suppliers, and physical capital that are directly related to actions in the nascent venturing process (cf., Aldrich & Fiol, 1994; Barney, 1997; Penrose, 1959; Wernerfelt, 1984). Network resources are then used in the nascent venturing process in order to establish the new venture, sometimes labeled the "network-founding hypothesis" (Burt, 1992, p. 36).

In order for venturing activities to be effective, they need to be reinforced by other actors, because behaviors that operate on the environment to produce effects that strengthen (reinforce) them are more likely to occur in the future (Foxall, 1997). Emotional reinforcement is symbolic, usually mediated by the responsive actions of others. It is verbal and mediated through other people or through one's self assessment of current behavior (Foxall, 1997). If we view this general relationship in relation to a more dynamic discussion of the start-up process including venture opportunity variation another picture emerges.

In the early stages of the nascent venturing process, the venture opportunity and exploiting actors may suffer from "liability of newness" (Stinchcombe, 1965). Actors exploring innovative venture opportunities in uncharted territories lack legitimacy along three important dimensions: cognitive, moral, and regulatory (Aldrich & Martinez, 2001). The lack of cognitive legitimacy refers to the fact that the new goods or service has not yet been accepted as a taken-for-granted feature of the environment of other individuals. Cognitive legitimacy is also the key to other resources, such as human and social capital and subsequently to moral and regulatory legitimacy

(Aldrich & Fiol, 1994; Deeds, DeCarolis, & Coombs, 1997). Early in the exploration process, innovative venture opportunities need to be reinforced and made legitimate in order to improve the exploring actors' self-confidence and to generate instrumental resources. This subtle and assertive support consists of general affirmation, verbally supporting the actor's role in the nascent venturing process. For example, a close friend or family member verbally supporting the idea strengthens the prospective entrepreneurs' self-confidence (Johannisson, 1995). This is also found in empirical investigations. Brüderl and Preisendörfer (1998) showed that emotional support from family and friends had a positive effect on new venture success.

Imitative opportunities, on the other hand, are already part of an established population, already accepted and legitimate, as such, they are not dependent on their closest family members, as a moral support, because they are already legitimate. Hence, emotional capital may play a significant role for actors exploring innovative venture opportunities but not for actors exploiting imitative opportunities. Again, venture opportunity variation together with social capital theory challenge the more generally accepted relationship between emotional social capital and the nascent venturing process. Thus, it is possible to argue that:

Hypothesis 4. The impact of emotional social capital (in the form of social reinforcement) on progress in the start-up process is different for innovative venture opportunities compared to imitative venture opportunities.

Instrumental social capital is defined as resources available through social interaction with other actors with or without being a stakeholder in the focal venture aimed to reinforce venture gestation behaviors. It is a construct based on social interaction as well as the content coming out of such interactions and we argue that this process is different for actors attempting to explore innovative venture opportunities compared to exploiting imitative venture opportunities.

Founders attempting to explore innovative venture opportunities lack legitimacy because they operate in situations with high levels of uncertainty and with only a few precedents (cf. Aldrich & Martinez, 2001). They face a number of potential constraints in the start-up process including the lack of pertinent entrepreneurial and organizational knowledge and, as stated above, the lack of legitimacy for their activities (Aldrich & Fiol, 1994; Hannan & Freeman, 1984; Nelson & Winter, 1982; Stinchcombe, 1965). To overcome this liability of newness, founders need to perform activities that make the new venture more reliable and accountable, which increase the legitimacy of the venture and hence enhancing the exploration process

(Hannan & Freeman, 1984; Meyer & Rowan, 1977). Firm founders cannot do everything simultaneously (Delmar & Shane, 2003). Therefore, enterprising actors exploring innovative venture opportunities need to select an order in which to perform different activities to seek legitimacy and to create barriers to secure first mover advantage. In the early phase of the exploration process for innovative opportunities, actors mainly undertake activities to generate legitimacy and to create barriers to hinder others from imitating their products and services (cf. Katz & Gartner, 1988). These activities aim to enhance the communicability of the business concept to other stakeholders. Imitative venture opportunities, on the other hand, do not suffer from “liability of newness” and it is possible to argue that instrumental social capital has a positive impact on the early stages of the nascent start-up process for imitative venture opportunities but not for innovative venture opportunities because conceptualizing ideas are an internally focused activity without so much effect from instrumental social capital.

A large and diverse personal network can speed up the enactment of the new venture after its initial focus on legitimating activities (Gartner et al., 1992). Entrepreneurs should invest in personal networking because all activities that make up the venture have to be empirically tested if a unique concept is to be generalized (cf. Gartner et al., 1992). Entrepreneurs must be able to activate different parts of their personal network according to their current needs. Network resources may as well be recyclable (cf. Johannisson, 1992). During the commercialization phase, the exchange process in Katz and Gartner’s (1988) terminology, ‘exploiting /exploring’ consists of resource acquisition and exchange of information with potential resource holders such as investors, suppliers, customers, and advisors. Consequently, actors exploring innovative venture opportunities need to interact with potential resource suppliers during the later stages of the exploration process and the same should be important for actors exploiting imitative venture opportunities. Theory gives at least anecdotal evidence that the impact of instrumental social capital on progress in the nascent venturing process is different for innovative venture opportunities compared to imitative venture opportunities. Thus it is possible to argue that:

Hypothesis 5. The impact of instrumental social capital (in the form of social network resources) on progress in the start-up process is different for innovative venture opportunities compared to imitative venture opportunities.

In sum, exploring innovative venture opportunities is systematically different from exploiting imitative venture opportunities because going

through uncertainty (exploring innovative venture opportunities) will be systematically different from going through risk (exploiting imitative venture opportunities).

METHOD

Recent reviews in the field show concerns about the level of sophistication in research design and research methods which perhaps have implications for the legitimacy of the field as a scholarly domain (see Chandler & Lyon, 2001; Davidsson & Wiklund, 2001). It appears that we have two main challenges to encounter, first there is a lack of longitudinal research, and second there is a low level of statistical sophistication (cf. Chandler & Lyon, 2001). This study seeks to build on these concerns by utilizing longitudinal population data as well as state-of-the-art longitudinal statistical analysis methods.

Data comes from the Panel Study of Entrepreneurial Dynamics (PSED). This is a unique multi-year tracking of a cohort of new ventures. Each venture opportunity is identified prior to launch of their firms and are being tracked through gestation, launch, and forward in time. There are two main purposes with the research design: (1) to provide population estimates for business start-ups and (2) to systematically follow a large number of ventures during the nascent start-up process possibly leading to a wealth-creating new venture. Moving research into the nascent stages of the entrepreneurial process is different because there are no firms at this stage there is just an initiative.

In order to optimize the number of possible venture initiatives in the sample the following screening question is used: "Have you, alone or with others, started a new firm during the last two years?" (cf. Reynolds, 2000; Reynolds et al., 2002; Shaver, Carter, Gartner, & Reynolds, 2001). A decision rule was used to determine which of the respondents that could be defined as a nascent and who had already started a business. The decision rule was based on so-called gestation behaviors. Gestation behaviors are different behaviors associated with starting a new firm such as earning money on sales, market research, and saving money to start a business. Based on Reynolds' (1997, 2000) suggestion, those that reported two or more firm gestation behaviors were considered "nascent ventures." This was the lower bound. The upper bound is concerned with when the start-up process is completed, i.e., when a business is considered as started. The start-up process was considered as completed when the following criteria were

fulfilled. A business is regarded as started if (a) money has been invested, (b) income has been made, and (c) the firm is already a legal entity (cf. Carter et al., 1996).

Data comes from two samples consisting of 49,979 individuals in Sweden during 1998. The first sample consists of individuals aged between 16 and 70 years and the second sample consists of individuals aged between 25 and 44 years. The purpose of the first sample, here as well as in the original PSED effort, was to get a representative sample of the adult population. A probability sample has the advantage of allowing inference to the population by use of statistical tests. The purpose of the second sample was to increase the probability of finding more interesting individuals to interview and follow. Of the 49,979 individuals randomly selected, it was possible to obtain a telephone number for 35,971 (71.9%). The remaining 28.1% were not listed ($n = 13\,338$), had severe disabilities ($n = 381$), or had moved abroad ($n = 289$). Of those contacted by telephone, 30,427 individuals (84.6%) agreed to participate. Out of these, 961 respondents qualified for the longer interview by answering in the screening interview that they were starting a business. Failure to establish renewed contact led to the loss of 147 cases. Another 133 individuals were dropped from the active case file after detecting, in the longer interview that they did not qualify. As a result, 622 individuals completed the longer interview: *Based on this sample; each venture opportunity is identified and classified and followed across time over a period of 18 months from our initial interview in 1998 to our final interview in year 2000.*

The initial screening interview (NV00, $n = 622$) collected information about the life of the venture before the interview and about the current status of the venture. *This is here referred to as initial status.* The research design allows the prediction of initial status with information that was collected retrospectively or simultaneously during the first interview. Subsequent interviews every sixth month collected data on venture level progress – *here referred to as progress in the nascent venturing process.* Response rates for eligible cases for the successive waves were 90.5% (6 months), 91.9% (12 months), and 98.5% (18 months).

The final sample consists of 259 ventures tracked across time. These ventures are similar in initial status because they all performed less than 15 gestation behaviors at the time for the initial interview. It is also assumed that most progress in the nascent venturing process takes place during the initial 18 months of a venture's life (cf. Carter et al., 1996). To solve the problem with heterogeneity in initial status, this study adopts the following approach. First, only ventures with less than 15 executed gestation behaviors

are included in the longitudinal analysis. This strategy reduces heterogeneity in initial status as well as provides us with information on progress and outcomes of the nascent venturing process. Second, LGM is used because this particular analysis method allows us to predict variation in initial status as well as development over time. Another problem concerning longitudinal studies is about abandonment over time because it is impossible to study progress in ventures that are abandoned early in the process. The problem with progress across time is solved by including only ventures with complete longitudinal data. This solution is based on two main arguments: first, an analogy to Penrose's (1959) argument that there need to be growth in order to be able to study it and, second, abandoned venture opportunities could be viewed as "false" venture opportunities and therefore not qualified to be included in the study. That is, actors may make a conjecture about, as they perceive it, a change in supply and demand, which in fact is not a "real" change. This means that there would be a number of perceived venture opportunities without any capacity to generate venture level profit.

In sum, this data set possesses two main advantages: first, it is an approximate random representation of new venture opportunities initiated in Sweden during the study. Second, it does not suffer from selection bias present in most samples of new ventures or biases due to hindsight or memory decay. Although, this is not a true random sample of venture opportunities, because the sampling frame is based on individuals, it is probably as close to a random sample of venture opportunities that we can obtain with contemporary research designs.

MEASURES

Two main aspects are important concerning measures in this study. (1) The context is the nascent start-up process. Most of our prior research is based on measures developed and validated in studies of already established firms and not in the nascent business start-up context. In short, this is an attempt to verify already established measures in a new setting. The present research is also a compromise in terms of items included due to the unique design of the study with 30+ scholars involved in the operationalization process. (2) In addition, this effort is truly different because it follows the start-up process across time. Both time varying and time invaring measures are included in the study. Following venture initiatives across time also allows us to follow aspects that change over time such as resources brought in to the initiative by different team members across the start-up process.

Hence, traditional firm level performance measures are here set aside to more behavior-based measures which better captures the dynamic aspects of the nascent start-up process because in the early stages of the start-up process performance measures such as profit, number of employees, and sales do not exist.

The dependent variable is instead progressing in the business start-up process. Progress is captured with a summation of 33 different gestation behaviors needed to create value from the venture opportunity (see Reynolds, 1997, and Carter et al., 1996, for a description of gestation behaviors; they are also listed in Table 1). The theoretical variation of the summed number of gestation activities is between 2 and 33.

We asked the respondents if they had initiated or completed any of the behaviors described in Table 1. If they had executed the gestation behavior, for example, if the respondent answered yes to the question – “Have you projected financial status” they were coded as “1” and if not “0”. This question was repeated during each follow-up interview and as the nascent business process developed, the number of initiated/completed gestation behaviors grew. This measure is time varying and measured every sixth month. For example, one venture may have performed five gestation behaviors at the time for the first interview, 13 gestation behaviors at the time for the 6 months follow-up and 17, 23, and 25 gestation behaviors at the time for each subsequent follow-up interview. The accumulation of

Table 1. Gestation Behaviors Capturing Progress in the Nascent Business Start-up Process.

Gestation Activities

Product/service idea or concept, product/services initial development, information of competition/opportunity, saving money to invest, team in process, team complete, business plan in process, business plan completed, projected financial statement

Application for funding, received funding successfully, unsuccessful search for funding completed, purchased raw materials, supplies, inventories, etc., started investing own money, established credit with a supplier, purchased major items

Marketing or promotion started, own phone line, permits and licenses in process, permits and licenses granted, registered at PRV,^a received tax licenses,^b application for patent, copyright, trademark in process, application for patent, copyright, trademark granted

Product/services tested on customers, business received income, product/services ready for sale, devoted full time to the business, first hire, revenues exceeded expenses

^aPRV (Patent och registreringsverket) is the Swedish authority that enforces registration of all new firms regardless of mode of organization.

^bIn Sweden, firms may apply for a tax license. This license ensures that they pay their taxes in advance and are following Swedish tax and VAT regulations.

Table 2. Accumulation of Gestation Behaviors Across Time.

	Latent Class Venture Opportunities	N	Mean	Std. Deviation	Sig. (2-tailed)
Gest beh00 accumulated	Innovative	40	9.13	3.18	0.57
	Imitative	219	8.81	3.17	
Gest beh06 accumulated	Innovative	40	14.85	4.62	0.03
	Imitative	219	13.34	3.87	
Gestat beh12 accumulated	Innovative	40	19.28	6.13	0.08
	Imitative	219	17.74	4.96	
Gest beh 18 accumulated	Innovative	40	22.80	7.57	0.04
	Imitative	219	20.54	6.05	

gestation behaviors across time is viewed as progress in the nascent venturing process as illustrated by the growing mean values in Table 2. It is interesting to see that, already in the descriptive results, the exploitation process for innovative venture opportunities includes more gestation behaviors throughout the nascent venturing process.

Table 3 describes the independent variables used in this part of the study. The left side of the table displays main constructs and variable names and the right side of the table displays the empirical operationalization of the constructs. The measure of venture opportunity variation is based on the latent class analysis (see Samuelsson, 2004). Posterior probabilities are used in order to distinguish between innovative and imitative venture opportunities. The latent class analysis is based on four items of innovativeness: applied for patent, RD focus, alone in the market, no competition. The sample consists of approximately 12% innovative and 78% imitative venture opportunities.

There is some crudeness, as pointed out above, in the measures. Each measurement, however, is based on the involvement of 30+ PSED scholars in entrepreneurship. Available data, however, varies in terms of validity. For example, environmental measures are all single item measures, which by definition are crude measures of rather complex empirical phenomena. Unique data from the nascent business start-up process, however, justify an exploratory measurement approach in order to develop a better understanding of the early stages of an important process and as a starting point for refinement and development of both theory and measurement aspects of the nascent stages of the entrepreneurial process.

Table 3. Independent Variables: Predicting Progress in the Nascent Venturing Process.

Variable	Operationalization
Human capital	
Start-up experience	We asked the respondent about his or her previous start-up experience together with each team member's start-up experience. Start-up experience is measured as a count of prior start-ups across the team members. This measure is time invariant and measured at the time for the first interview
Industry experience	We asked the respondent how many years of work experience have they had in this industry – the one where the new business will compete? The same information was received about each member in the start-up team. Industry experience is measured as a count of years of experience in the venture opportunity industry across the team members. This measure is time invariant and measured at the first interview
Formal education	Respondents were asked to indicate the highest level of education they had completed. This variable, ranging from primary to doctorate, was coded from 1 equals primary school to 9 for the doctorate. Information about education comes only from the respondent and not for the entire team
Social capital	
Emotional social capital	We asked the respondent "How would you describe the encouragement you received from family, relatives, or other close friends? Would you consider it very weak, weak, neither weak nor strong, strong, nor very strong?" The answers are given on a five-item scale where "1" equals very weak, "2" equals weak, "3" equals neither weak or strong, "4" equals strong, and "5" equals very strong. This measure is time invariant and measured at the time for the first interview
Instrumental social capital	Instrumental social capital is measured through a summation of all personal network resources related to the following resources, introduction to other people, information or advice, access to financial resources, physical resources, and other kinds of service. During each interview, we asked the respondent about the frequency and content of other actors' interaction with the venture exploitation process. Each team member, and any additional person, identified as a resource contributor reported number of contacts and the content of that contact. By adding the number contacts across persons and time we obtain a construct of instrumental social capital. This measure is time varying, because in each interview the respondent is asked about any additional contacts during the exploitation process. Network contacts are then summed across the entire team in each interview

CONTROL VARIABLES

The proposed model also includes environmental explanations to variation in progress in the nascent start-up process. Two main factors are included: (1) economic growth and (2) level of competition.

Economic growth increases the aggregated demand of products and services because spending power in an economy increases and the actors may capture new demand through the exploitation and exploration of venture opportunities, thus positively influencing both entry and the nascent venturing process. Empirical research especially focused on the rates of new ventures supporting the existence of a positive relationship between economic growth and new venture formation (Orr, 1974; Gorecki, 1975). However, the logical extension of this leads to the assumption that economic growth will also affect survival as long as enterprising actors perceive the environment as benign. Theory gives little advice on whether economic growth will affect innovative opportunities differently compared to imitative venture opportunities. Instead, a perceived positive environment will have a positive influence on the nascent venturing process for both innovative and imitative venture opportunities.

Despite the existence of venture opportunities, potential new ventures can be dissuaded by the existence of different types of entry barriers (for a review of various definitions of entry barriers see Gilbert, 1989). New ventures may be hindered in the nascent venturing process if barriers are erected against them (Penrose, 1959). Empirical research has indicated that entry barriers tend to have greater impact on new venture formation than diversifying firms (Gorecki, 1975).

Barriers to entry may be established by pricing, plant location, excess capacity, and product differentiation/proliferation (Scherer & Ross, 1990); economics of scale (Bain, 1956); significant sunk costs (Baumol, 1993), government regulations, incumbent retaliation, access to distribution channels, and proprietary knowledge (Porter, 1980); and industry concentration (Orr, 1974). The traditional belief is that greater competitiveness results in barriers to enter and will have a negative effect on the nascent venturing process (Orr, 1974; Dean & Meyer, 1996).

However, one significant factor that enhances new venture survival is its competitive advantage (Timmons, 1999). The better perception enterprising actors have about their competitors the higher probability that the actors would make better decisions in the nascent venturing process. A better awareness of the focal ventures competitors will enhance the probability of both dissolution and growth. Because, if competition is perceived to be

Table 4. Control Variables.

Independent Variable	Operationalization
Environment	
Economic growth	We asked the respondent “Would you describe the local economy as getting stronger, stable, or getting weaker? (“1” equals “getting weaker” “2” equals “stable” and “3” equals “getting stronger”).” Time invariant and measured at the time for the first interview
Industry competitiveness	We asked the respondent “Do you expect the competition to be low, moderate, or strong for this new business? (“1” equals “expect no competition”, “2” equals “expect low competition, “3” equals “moderate competition,” and “4” equals “expect strong competition”).” Time invariant and measured at the time for the first interview
Other	
Time in the process	Time is a time invariant measure and is measured at the time for the first interview. Time in the process is measured as the calculated number of months from the date of the first reported initial gestation behavior to the starting date for the first interview

strong, but at the same time manageable the venture may have carved out a competitive niche in the market. However, if enterprising actors perceive competition to be too fierce, the venture is likely to be disbanded. For example, if competition is perceived as strong and understood that the exploitation process may grow in areas where there is a known market gap that is not captured by other competitors.

Progress in the start-up process could be achieved by targeting narrow market segments that have been overlooked by established firms. That is, a perception of a strong competitive environment can either be a sign of a niche in which the venture has greater chances to survive or strong competition will have a negative influence on the start-up process because the saturation level in an industry may be reached. Innovative ventures may, in addition, by definition be without competition. The exact wordings of the items are reported in [Table 4](#).

ANALYSIS METHODS

In their seminal article, [Low and MacMillan \(1988\)](#) argued that entrepreneurship research should include longitudinal designs. This is later repeated

by Aldrich and Baker (1997), and Davidsson (2000, p. 15) who state that: “the exploitation process, as well as latter parts of the discovery process ... are best studied with longitudinal approaches.” Despite a long tradition of “knowing what’s best practice” the field has only recently developed large-scale longitudinal survey designs suitable to study entrepreneurship across time (Reynolds & White, 1993; Shaver et al., 2001).

There are two main challenges with this approach. First, there is a need to study individual variation in initial status – i.e., actors are not exactly at the same status at the time for the first interview. Second, there is a need to be able to study individual variation in development across time – i.e., individual growth trajectories vary for example due to venture opportunity variation. Instead of relying on traditional OLS regressions not allowing individual variation and time varying measures this study takes the field one step further in terms of new statistical methods. LGM is a new latent variable technique, which has advantages over both OLS regression and event-history models. LGM allows the researcher a richer model framework including time varying and time invaring variables as well as individual models for different groups (cf. Muthén & Khoo, 1998).

A basic idea behind growth modeling is that individual units differ in their development across time. The nascent venturing process is likely to show differences in development as a function of opportunity variation and differences in background characteristics such as resource endowment and environmental forces. It is evident that entrepreneurs’ curriculum is quite varied and entrepreneurs are likely to show differences in growth over time due to differences in other aspects too. However, state-of-the-art statistical tools such as LGM enhance our analysis capacity allowing us to model individual progress in the nascent venturing process. The following description draws heavily on Muthén and his associates’ publications (Muthén, 1991; Muthén, 2000; Muthén & Curran, 1997; Muthén & Khoo, 1998; Muthén & Muthén, 1998). A conventional path-diagram of a structural model can be used to show the growth model graphically. (Squares represent observed variables and circles represent latent variables.) Fig. 2 illustrates the proposed latent longitudinal growth model of the nascent venturing process.

The model estimates the intercept at which level the opportunity exploitation process is captured through the summation of gestation behaviors across time (Igestb = estimation of number of gestation behaviors). The intercept and growth (Ggestb) is explained by both time varying and time invaring variables (time invaring, “res” (resources include both human and social capital, “env” = environment). Time varying variables are

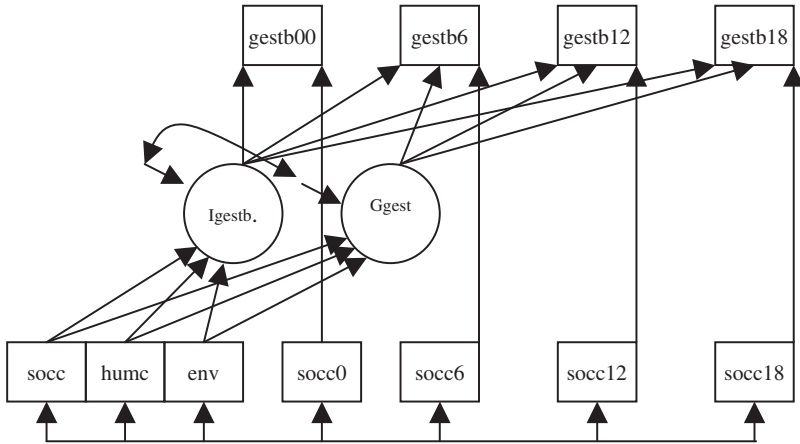


Fig. 2. Graphical Representation of a Growth Model for Four Time Points (based on Muthén & Khoo, 1998).

instrumental social capital (socc0-18). Venture opportunity variation is captured through a simultaneous two-group model described below.

LGM considers two main parts of individual development. First, the number of gestation activities is likely to differ at the time for the first interview due to experiences prior to the first interview. This will be referred to as individual variation in *initial status* or random intercepts in statistical terms. The actual range is between 2 and 21 performed gestation behaviors at that time. This is problematic because we capture growth through the accumulation of gestation behaviors across time and if all possible behaviors are already executed there will be no variation left to explain. Therefore, only the ventures that performed less than 15 gestation behaviors at the time for the first interview are included in this analysis. This analysis includes only the initial 18 months because most activity was reported during this period.

The second type of individual development occurs in the exploitation/exploration process in which ventures are likely to differ with respect to the growth in their performance across time, which is here referred to as *individual variation in growth rate*. Growth can be described as a linear trend and in this case, the statistical term of random slopes can be used. However, growth deviating from a straight line is also important and considered here.

Fig. 3 illustrates the idea of individual growth trajectories. The figure shows the development over time for three venture opportunities. The growth trajectories represent three cases of progress in the nascent start-up process.

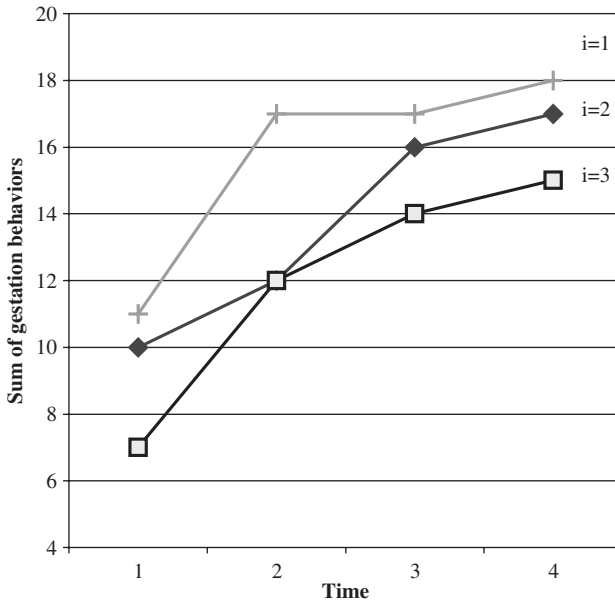


Fig. 3. Growth Modeling in Terms of Random Coefficients and a Multilevel Model.

The individual trajectories are different but all three decrease in development across time. This suggests a non-linear growth trajectory, which is the expected shape because there is not an indefinite number of gestation behaviors.

Key results in the analysis are estimates of the average initial status, the average growth rate (growth = accumulation of gestation behaviors across time), and estimates of variation across venture opportunities of initial status and of growth rate. In addition, for each measurement occasion, time-specific factors also influence the performance so that a certain performance that is expected is in fact not realized. In statistical terms, these factors are described as residuals.

Growth curve analysis is particularly useful when an attempt is made to explain individual variation in initial status and growth rate using background variables for each individual. These variables are viewed as causes of growth preceding the measurement occasion and do not vary across time. Such variables are of substantial interest in that they are predictors of growth. More elaborate analysis also attempts to account for the fact that development in the business start-up process may be hampered or enhanced

by time-specific background variables such as developments in a venture's instrumental social network structure.

It may also be of interest, as in this case, to simultaneously analyze growth in several populations. For example, innovative venture opportunities and imitative venture opportunities may be seen as representing different populations. Consequently, I want to test a two-group analysis allowing for various hypotheses of variation across the two groups. To test the degree of variation between innovative and imitative venture opportunities more formally, the following series of analysis steps are useful (cf. [Muthén & Khoo, 1998](#)). In the first analysis, full invariance across the two opportunity types of the growth model parameters are imposed. This is the baseline model saying that there are no differences between innovative and imitative venture opportunities. This model can then be tested against subsequent models that allow different parts of the model to be different. This means that the model estimates each parameter and allows differences in all parts of the model. A χ^2 difference test is used in order to establish significant model improvements.

If a model with group variation is found to fit the data significantly better than the model without group variation, the following steps are used in order to identify more exactly where the differences reside. First, variation is allowed in the marginal part of the model consisting of the covariates because the growth model does not concern itself with this part. Second, it is possible to allow variation in the growth model residual variance (variance remaining when conditioning on the covariates), namely initial status and growth rate residuals. Third, it is also possible to allow variation in the growth model's conditional means given the covariates, namely the growth rate intercept and the initial status intercept ([Muthén & Khoo, 1998](#)). Following this modeling strategy, it is possible to investigate how the venture exploration process may be different for innovative venture opportunities compared to the exploitation process for imitative venture opportunities.

RESULTS: A FORMAL EMPIRICAL TEST OF VARIATION IN THE NASCENT BUSINESS START-UP PROCESS

This section report results from the empirical test of variation in the nascent venturing process given venture opportunity variation. The model includes both an overall assessment of model fit as well as differences between innovative and imitative venture opportunities. The entire model is reported

initially and used to test formally whether exploring innovative venture opportunities are systematically different from exploiting imitative venture opportunities. Descriptive data such as mean, standard deviations, and correlations for both innovative and imitative venture opportunities are reported in Table 7.

The first step in the analysis is to estimate a population model without venture opportunity variation. The χ^2 value of 1184.51 with 97 d.f.s indicates poor fit, which is expected, because venture opportunity variation suggests that there are, at least, two groups of venture opportunities. Fit statistics in Table 5 show that both the innovative venture opportunity model and the imitative venture opportunity model, when estimated separately, fit the data reasonably well.

Innovative venture opportunities with a χ^2 value of 19.37 with 28 d.f.s, p -value = 0.50 RMSEA estimate 0.00, imitative venture opportunities with a χ^2 value of 25.80 with 28 d.f.s, p -value = 0.69 RMSEA estimate 0.00.¹ It is possible to use the sum of the two models as a baseline model that can be compared to the single model above. The two-group longitudinal growth model has a χ^2 value of 55.17 (19.37 + 22.80) with 56 d.f.'s (28 + 28).

A χ^2 difference test is used to investigate whether the two-group model fit the data significantly better compared to the one-group baseline model. The initial model has a χ^2 value of 1184.51 with 97 d.f.s and the two-group solution has a χ^2 value of 55.17 with 56 d.f.s which gives a χ^2 difference test value of 1129.34 with 41 d.f.'s, p -value = 0.000 these results clearly show

Table 5. Fit Statistics from Separate Models of the Business Start-up Process.

Statistics	Innovative Venture Opportunity	Imitative Venture Opportunity	Two Group Model Base-Line Model	Final Model Variation on all Parameters
<i>N</i>	40	219	259	259
	29.3		55.1	
χ^2	7	25.80	7	55.17
<i>Df</i>	28	28	56	60
<i>p</i> -value	0.50	0.69	0.65	0.65
RMSEA	0.00	0.00	0.00	0.00
Estimate				
90% C.I.	0.00	0.12	0.00	0.41
Probability	0.65	0.98		
RMSEA				
< = 0.05				

that the two-group solution fits the data significantly better compared to the single population model. *The χ^2 difference test gives empirical support to the overall hypothesis that the process of exploring innovative venture opportunities is systematically different from the process of exploiting imitative venture opportunities.*

The estimates in Table 6 indicate how much the dependent variable changes, which in this case is the latent variable initial status or growth; given one unit change in the independent variable (standardized YX (*StdYX*) is the standardized effect measured at the same scale; S.E., the standard error allows us to calculate the *T*-value (EST/S.E. interpreted as *Z* -values).² Confidence intervals are included at the 95% level.

The estimated initial status mean value indicates that we capture innovative venture opportunities (an initial status mean of 3.24) earlier in the nascent venturing process compared to imitative venture opportunities (an initial status mean of 5.74). The calculated growth rate shows that innovative venture opportunities grow faster with a growth rate mean of 4.88 compared to a growth rate mean of 4.27 for imitative venture opportunities.

Initial status regression and growth rate regression indicate how progress in the nascent business start-up process is regressed on the proposed set of covariates and that part of the model will be discussed below. The first section discusses results concerning how resources influence initial status and growth in the nascent venturing process and the second part reports results from residual parts of the model.

Table 6 reports that industry experience is not significantly related to initial status in the nascent venturing process for neither innovative nor for imitative venture opportunities. In addition, industry experience has little effect on progress in the nascent venturing process. It is interesting to see that industry experience, often conceived as one of the main explanations to the nascent business start-up process, has no influence on progress for either opportunity type. One tentative explanation for this result is that imitative venture opportunities reside inside known product-market areas, which allow actors to recognize and exploit venture opportunities based on existing knowledge that is easy to obtain and process, which make industry experience valuable but not a necessity.

The second human capital variable, start-up experience, capturing another aspect of tacit knowledge, indicates again that venture opportunity variation makes a difference. Start-up experience (Est. = 2.54, *T*-value = 3.47, *StdYX* = 0.56) has a strong positive influence on progress in initial status for innovative venture opportunities but without effect on imitative venture opportunities (Est. = 0.28, *T*-value = 0.57, *StdYX* = 0.05).

Table 6 also reports that start-up experience is less important to progress for either opportunity type.

It appears from these results that human capital in the form of industry experience has little effect on progress in the nascent venturing process for either innovative or imitative venture opportunities. Start-up experience, however, has a positive impact on progress in the nascent venturing process for innovative venture opportunities but not for imitative venture opportunities. It is also important to note that this relationship is found in the early stages of the nascent venturing process (as indicated by the initial status regression) and not in the later stages of the process (as indicated by the growth part of the model). Thus, this study gives empirical support for Hypothesis 2.

The third human capital variable included in the analysis is codified knowledge in the form of formal education. Table 6 reports that formal education has no effect on initial status for either innovative or imitative venture opportunities. However, a formal education has a significant positive impact on growth in the nascent venturing process for innovative venture opportunities (Est. = 1.85, T -value = 2.39, StdYX = 0.37) and a negative impact on growth for imitative venture opportunities (Est. = -0.80, T -value = -2.99, StdYX = -0.26). These results indicate that codified knowledge (in the form of formal education) has a strong effect on progress in the later stages of the nascent venturing process for innovative venture opportunities but a negative effect on progress for imitative venture opportunities. These results strengthen the impression that exploring innovative venture opportunities are systematically different from exploiting imitative venture opportunities that gives empirical support for Hypothesis 3.

Table 6 reports how social capital (in the form of emotional and instrumental social capital) influences initial status and growth in the nascent venturing process. We capture emotional capital with a measure of social reinforcement, which, as indicated by Table 6, has a significant positive impact on initial status for innovative venture opportunities (Est. = 1.37, T -value = 2.02, StdYX = 0.30) but no significant effect on imitative venture opportunities. Table 6 also reports that emotional capital (in the form of social reinforcement) has no effect on growth for either innovative or imitative venture opportunities. Thus, emotional capital (in the form of social reinforcement) has a significant effect on the early stages of progress in the nascent venturing process for innovative venture opportunities but no effect on the nascent venturing process for imitative venture opportunities. Thus, this study gives empirical support for Hypothesis 4.

Table 6. Longitudinal Growth Model Results.

	Innovation Venture Opportunities					Imitative Venture Opportunities				
	Est.	S.E.	T-value	Std. YX	95% CI	Est.	S.E.	T-value	Std. YX	95% CI
γ Intercept										
Initial status mean	3.24					5.74				
Growth scores/steps										
Gest.Beh00	0	0	0	0.00		0	0	0	0.00	
Gest.Beh06/00-06	1.00/1	0	0	0.56		1.00/1	0	0	0.40	
Gest.Beh12/06-12	1.65/0.65	0.1	17.49	0.69		1.92/0.92	0.08	25.42	0.60	
Gest.Beh18/12-18	2.20/0.55	0.16	14.16	0.76		2.50/0.58	0.12	20.92	0.65	
Growth rate mean	4.88					4.27				
Initial status regression										
Industry experience	0.24	0.27	0.90	0.12	0.08	0.05	0.16	0.31	0.03	0.02
Start-up experience	2.54	0.73	3.47	0.56	0.23	0.16	0.28	0.57	0.05	0.04
Formal education	-0.36	0.76	-0.48	-0.07	0.24	-0.48	0.41	-1.17	-0.10	0.05
Emotional social capital	1.37	0.68	2.02	0.30	0.21	0.35	0.29	1.22	0.10	0.04
Economic growth	-0.37	0.47	-0.78	-0.11	0.15	0.21	0.34	0.62	0.05	0.05
Industry comp.	-0.63	0.45	-1.42	-0.22	0.14	0.49	0.29	1.70	0.14	0.04
Time in expl. Process	0.005	0.007	0.70	0.10	0.00	0.006	0.003	1.71	0.14	0.00
Growth rate regression										
Industry experience	-0.28	0.27	-1.02	-0.15	0.08	0.13	0.10	1.27	0.11	0.01
Start-up experience	-0.06	0.75	-0.07	-0.01	0.23	0.13	0.18	0.69	0.06	0.02
Formal education	1.85	0.78	2.39	0.37	0.24	-0.80	0.27	-2.99	-0.26	0.04
Emotional social capital	0.60	0.70	0.8	0.14	0.22	0.25	0.18	1.36	0.12	0.02
Economic growth	-0.22	0.49	-0.46	-0.07	0.15	0.09	0.22	0.40	0.03	0.03
Industry comp.	-0.66	0.47	-1.40	-0.25	0.15	0.07	0.19	0.36	0.03	1.00
Time in expl. Process	0.003	0.007	0.45	0.07	0.00	-0.004	0.002	-1.88	-0.16	0.00
Inst soc. cap00	-0.06	0.09	-0.71	-0.11	0.03	0.09	0.04	2.13	0.14	0.01

Inst soc. cap06	0.14	0.10	1.38	0.18	0.03	0.14	0.04	3.65	0.20	0.01
Inst soc. cap12	0.29	0.14	2.11	0.28	0.04	0.21	0.04	4.88	0.24	0.01
Inst soc. cap18	0.40	0.17	2.29	0.32	0.05	0.26	0.05	5.08	0.26	0.01
Residual covariance of initial status. growth rate										
	2.30	1.19	1.94	0.53	0.37	1.03	0.52	1.97	0.26	0.07
Inst soc. cap00 with 06	1.13	0.965	1.17	0.33	0.30	0.458	0.66	0.70	0.26	0.09
Inst soc. cap06 with 12	0.909	0.782	1.16	0.04	0.24	1.08	0.35	3.08	0.06	0.05
Inst. soc. cap12 with 18	3.16	2.80	1.28	0.10	0.87	2.82	1.46	1.93	0.10	0.19
Intercepts										
Initial status	0.61	4.44	0.13	0.22	1.38	5.22	2.01	2.60	0.22	0.27
Growth	2.25	4.56	0.49	0.89	1.41	3.76	1.29	2.90	0.40	0.17
Residual Variances										
Gest.Beh00	2.86	1.43	2.00	0.29	0.44	3.15	0.82	3.85	0.31	0.11
Gest.Beh06	1.73	1.21	1.42	0.09	0.38	3.12	0.62	4.99	0.21	0.08
Gest.Beh12	4.84	1.94	2.49	0.12	0.60	3.18	1.02	3.13	0.13	0.13
Gest.Beh18	6.92	4.86	1.42	0.12	1.51	5.97	2.31	2.58	0.16	0.31
Initial status	2.72	1.41	1.92	0.36	0.44	6.28	0.97	6.48	0.94	0.13
Growth	3.49	1.48	2.36	0.54	0.46	2.17	0.55	3.97	0.89	0.07
Latent variable R-square										
Initial status	0.87					0.06				
Growth rate	0.49					0.12				
	0.49					0.12				

Note: T -value > 1.96 equals significance on the 5% level. T -value > 1.64 equals significance on the 10% level.

Table 7. Descriptive Results.

Equilibrium Venture Opportunity	Mean	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Status local economy	2.42	0.64														
2. Expectation of competition	3.09	0.09	0.80													
3. No. month in process	3.70	0.00	-0.01	0.89												
4. Emotional social capital	1.45	0.08	-0.02	0.06	0.17											
5. Instrumental social capital ne00	1.09	0.03	0.12	-0.08	0.11	1.02										
6. Instrumental social capital ne06	1.18	0.02	0.11	-0.04	0.11	0.97	1.02									
7. Instrumental social capital ne12	1.30	0.03	0.15	-0.04	0.09	0.88	0.94	1.05								
8. Instrumental social capital ne18	1.34	0.02	0.15	-0.04	0.08	0.87	0.93	0.99	1.07							
9. Gestation behaviors ne0	12.13	0.05	-0.04	0.22	0.06	0.20	0.20	0.15	0.15	4.90						
10. Gestation behaviors ne06	14.83	0.06	0.05	0.20	0.11	0.22	0.23	0.22	0.22	0.82	4.54					
11. Gestation behaviors Ne12	15.56	0.06	0.07	0.17	0.11	0.23	0.24	0.23	0.24	0.75	0.95	4.42				
12. Gestation behaviors Ne18	16.16	0.05	0.05	0.21	0.09	0.24	0.25	0.25	0.26	0.69	0.88	0.95	4.41			
13. Education	4.18	0.07	0.09	-0.05	0.09	0.13	0.13	0.15	0.15	-0.13	-0.05	0.00	0.00	2.34		
14. Work exp. team Ne0	0.66	-0.14	0.03	0.03	-0.09	-0.09	-0.10	-0.11	-0.11	-0.11	-0.20	-0.18	-0.14	-0.09	1.11	
15. Start-up exp. team Ne0	0.44	0.01	0.13	-0.10	0.00	0.43	0.43	0.38	0.38	0.06	0.09	0.13	0.11	0.07	-0.06	0.76

Sample statistics Correlations (off-diagonals) and Standard Deviations (diagonals) $n = 199$

Innovative Venture Opportunity	Mean	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Status local economy	2.65	0.54														
2. Expectation of competition	2.97	-0.15	0.87													
3. No. month in process	3.94	-0.26	0.21	0.77												
4. Emotional social capital	1.45	0.29	-0.08	0.01	0.19											
5. Instrumental social capital ne00	1	0.18	0.16	-0.12	0.00	0.98										
6. Instrumental social capital ne06	1.07	0.07	0.19	-0.05	0.05	0.96	0.95									
7. Instrumental social capital ne12	1.2	0.12	0.21	-0.11	0.04	0.86	0.92	0.94								
8. Instrumental social capital ne18	1.28	0.07	0.17	-0.11	0.03	0.86	0.91	0.97	1.01							
9. Gestation behaviors ne0	11.6	0.01	0.22	0.03	0.20	0.21	0.28	0.29	0.24	4.46						
10. Gestation behaviors ne06	15.4	-0.02	0.19	-0.06	0.30	0.30	0.40	0.45	0.44	0.61	4.31					
11. Gestation behaviors Ne12	15.7	-0.01	0.23	-0.06	0.30	0.35	0.44	0.49	0.49	0.58	0.96	4.45				
12. Gestation behaviors Ne18	15.9	-0.02	0.24	-0.07	0.28	0.39	0.49	0.53	0.53	0.59	0.96	1.00	4.4			
13. Education	3.82	0.25	0.00	-0.15	0.01	0.15	0.09	0.09	0.07	0.26	0.15	0.08	0.08	2.39		
14. Work exp. Team Ne0	0.67	0.03	-0.23	0.05	0.12	0.10	0.05	0.01	-0.02	-0.24	-0.09	0.03	0.03	-0.16	1.08	
15. Start-up exp. team Ne0	0.44	0.13	0.29	-0.29	-0.04	0.32	0.39	0.39	0.35	-0.05	0.21	0.27	0.26	0.15	0.04	0.76

Social capital consists as well of a wide array of instrumental resources that increases the efficiency of actions in the exploitation and the exploration process. Instrumental social capital is a time varying construct directly related to progress in the nascent venturing process. Results in the lower part of Table 6 show that instrumental social capital has no impact on the initial measurements of progress in the nascent venturing process for innovative venture opportunities but becomes significant during the later stages of the process (Inst soc. cap00; Est. = -0.06 , T -value = -0.71 , StdYX = -0.11 ; Inst soc.cap06, Est. = 0.14 , T -value = 1.38 , StdYX = 0.18 ; Inst soc. cap12, Est. = 0.29 , T -value = 2.11 , StdYX = 0.28 ; Inst soc. cap18, Est. = 0.40 , T -value = 2.29 , StdYX = 0.32).

Table 6 also reports that instrumental social capital has a significant impact on the entire nascent venturing process for imitative venture opportunities (Inst soc. cap00; Est. = 0.09 , T -value = 2.13 , StdYX = 0.14 ; Inst soc.cap06, Est. = 0.14 , T -value = 3.65 , StdYX = 0.20 ; Inst soc. cap12, Est. = 0.21 , T -value = 4.88 , StdYX = 0.24 ; Inst soc. cap18, Est. = 0.26 , T -value = 5.08 , StdYX = 0.26). These results indicate that instrumental social capital has a strong and continuous impact on progress in the nascent venturing process for imitative venture opportunities compared to innovative venture opportunities for which the effect becomes significant later in the process. Thus, this study gives empirical support to Hypothesis 5. Instrumental social capital has a positive impact on progress in the nascent venturing process regardless of venture opportunity variation but it is increasingly important for innovative ventures.

Altogether, the empirical results in this section point at the diversity and richness that we find in the nascent venturing process. Resources have a dynamic and sequential impact on progress in the nascent venturing process, which is hidden from an entrepreneurship research agenda that neglects the importance of venture opportunity variation. At this stage, it is clear that exploring innovative venture opportunities is systematically different from exploiting imitative venture opportunities.

Table 6 also reports empirical results concerning the proposed relationship between control factors such as local economic growth, industry competitiveness, time, and progress in the nascent venturing process. The overall results displayed in Table 6 suggest that forces in the environment has a limited impact on the nascent venturing process and that time in the process have a marginal effect on progress in nascent venturing process.

Furthermore, Table 6 indicates that awareness of a strong perceived competition has a positive influence on progress in the nascent venturing process for imitative venture opportunities (Est. = 0.49 , T -value = 1.70 , StdYX = 0.14)

but there is no effect of competitive awareness on progress in the nascent venturing process for innovative venture opportunities. This is also a result that was expected because innovative venture opportunities are by definition without competition. However, it is also clear that this can be an over-estimation of innovativeness, because, when actors start exchange information in the nascent business process they might recognize that they are not alone.

Finally, it is interesting to see that the number of months that passed from the execution of the first gestation behavior to the start of the first interview has no effect on the exploration process for innovative venture opportunities and only limited effect on imitative venture opportunities. An extensive period of time in the nascent venturing process has both a positive and a negative impact on progress in the nascent venturing process (initial status Est = 0.006, T -value = 1.71, StdYX = 0.14 and growth rate Est = -0.004, T -value = -1.88, StdYX = -0.16). Imitative venture opportunities that have been around for a while since their first gestation behavior are captured later in the nascent venturing process. This group has at the time for the first interview already performed a number of gestation behaviors. On the other hand, this group is less likely to show progress in the nascent venturing process after the initial interview because their pace is very slow.

In addition to variation in the exploitation process predicted by the proposed covariates, they also create differences in their correlated residuals and in individual residual estimates. Table 5 shows significant amount of variation in initial status for imitative venture opportunities but not for innovative opportunities *which indicate that imitative venture opportunities are a more heterogeneous group in terms of initiated and completed gestation behaviors when captured.*

The estimated variation in growth rate is not significant for innovative opportunities, implying that there is a limited individual variation in growth, which is the opposite from imitative venture opportunities that vary significantly in growth rate, implying that imitative venture opportunities are more heterogeneous in terms of individual growth trajectories. This means that most innovative venture opportunities pass through the nascent venturing process along similar growth trajectories while there is a greater variation between slow, medium, and fast growers among imitative venture opportunities.

The residual covariances of gestation behaviors are significant from gestation behavior 06 and forward indicating that there are other factors influencing growth for imitative venture opportunities. This means that traditional measures in entrepreneurship research fail to capture progress in the nascent venturing process for imitative venture opportunities.

Residual variances show a similar pattern. Innovative opportunities show less residual variance compared to imitative venture opportunities. This can be a result due to a larger amount of measurement error in the reporting of gestation behaviors by the imitative venture opportunity group.

Perhaps the strongest indication of difference between the two processes is found in the R-Square values presented in the bottom of Table 6. The model is well suited to explain progress in the nascent venturing process for innovative venture opportunities (R-square initial status = 0.87, growth rate = 0.48) but fails to do so for imitative venture opportunities (R-square initial status = 0.06, growth rate = 0.12). It is evident that the longitudinal model of the nascent business start-up process explains a substantial share of variation in initial status and growth rate for innovative venture opportunities. It is equally clear that the results also indicate that the model is less effective in explaining initial status and growth rate for imitative venture opportunities. *This result indicates that many better-chosen covariates are needed to explain progress in the nascent venturing process for imitative venture opportunities.* Entrepreneurship research and entrepreneurship literature in general seem to capture and sufficiently explain progress for innovative venture opportunities. However, these results indicate a bias toward research and theory building around innovative ventures and their development. This is not a problem as long as researchers clearly state that they want to contribute only to one particular phenomenon.

In sum, exploiting innovative venture opportunities includes tacit and codified knowledge, emotional capital, and a growing instrumental social capital. On the other hand, progress in the nascent business start-up process for imitative venture opportunities is explained to some extent by a competitive awareness and a large and growing use of instrumental social capital. This again yields the main implication from this part of the study. Entrepreneurship theory provides endogenous explanations to progress of innovative venture opportunities. By contrast, entrepreneurship theory provides limited explanatory power for progress among imitative venture opportunities and it is possible to accept Hypothesis 1.

DISCUSSION

I started this chapter by stating an overall question: Why is it that some new ventures successfully survive the business start-up process, transforming from a venture opportunity into a new venture and others not? The answer is both simplistic and complex, but it is probably a matter of “fit”. Innovative venture

opportunities, originated from creative change in supply and demand fit with an exploration process where enterprising actors search for legitimacy and reinforcement, concretize their concept, use their social and human capital in different sequences in the nascent business start-up process. Imitative venture opportunities, originated from optimizing change in supply and demand, are dependent on enterprising actors' social capital and knowledge of competitors. If we view this from a general theory of entrepreneurship perspective, it seems that we have two non-compatible perspectives inside a general theory framework. At least at a distance is, the theoretical propositions of the evolutionary/creative approach incompatible with the propositions of the equilibrium/optimizing approach. The incompatibility, however, does not necessarily cause that the two approaches are competing alternatives. They can be so only if they are explaining the same phenomenon with the same set of explanations. The problem and perhaps the explanation to why these are viewed as competing alternatives is that both seek to explain economic development but they do so from two different types of economic change – one type of economic change expresses a creative aspect, which generates developmental processes under uncertainty – here discussed in terms of exploring innovative venture opportunities. Another type of economic change expresses an optimizing aspect, which generates equilibrium adjustments under risk – here discussed in terms of exploiting imitative venture opportunities (Knight, 1921). Equilibrium and disequilibrium perspectives should not absorb the other because they both provide important explanations to entrepreneurship (cf. Kirzner, 1973; Schumpeter, 1934) and fits well inside a general theory of entrepreneurship. A theory, however, to be valuable needs to have specific boundaries and explicit boundary conditions. On a general level, it is assumed that the model is sufficient in order to explain progress in the nascent business start-up process, but to be of a practical value the model needs to be more specific in terms of boundary and explanations. Clearly, one contribution this study makes is the test of general theory on the nascent stages of the entrepreneurial process. On the other hand, to be general, also other sequences in this process need to be theoretically explored and empirically verified.

Further development of the model includes refinements in explanations given venture opportunity variation. Empirical results in this study show that different explanations are important predictors in different sequences of the process and that one particular explanation could be found for exploitation processes but not for exploration processes. This points at the second theoretical contribution, further development of new and more explorative explanations, especially for imitative venture opportunities, and refinement of existing explanations both for imitative and innovative venture opportunities.

The third contribution is related to a question: Is imitative venture opportunities entrepreneurship or not? The question is, of course, related to how entrepreneurship is defined. Entrepreneurship viewed as creation of new economic activity is based on the dual forces of exploitation processes as well as the creative exploration processes as important aspects of the creation of new economic activity. If we only include entrepreneurial opportunities, as suggested by [Shane and Venkataraman \(2000\)](#), we disqualify 90% of all new ventures and we will inevitably be mixed up with studies of innovations which already is an existing field. Instead, if we, focus our attention on the creation of new economic activity our research agenda becomes including instead of excluding, because as shown here, it is possible to develop and build a general theory of entrepreneurship. The next step will be to refine it further, especially, through development of measurement and variation in explanations across time. This is a great challenge both in terms of theory building but also in terms of tying together cross-sectional and/or longitudinal research with more general explanations across the life cycles of enterprises.

One explanation to differences in the nascent business start-up process is evident if we relate results concerning initial status and growth to the sequence of gestation behaviors suggested by [Katz and Gartner \(1988\)](#). The innovative exploration process is initially focused on intentions and in the latter part of the process on boundary and exchange-related behaviors. Our results suggest that tacit knowledge, indicated by start-up experience, is related to the initial sequence and codified knowledge to boundary and exchange-related behaviors for the exploration process for innovative venture opportunities.

It is possible to conclude this part with two main implications for entrepreneurship theory. First, entrepreneurship as an economic phenomenon including both optimizing and creative processes requires valid explanations to both processes in order to become a legitimate scholarly domain. Second, this part of the study tests a theory in which entrepreneurship is regarded as a behavioral phenomenon. That is, progress in the nascent venturing process is measured through a set of behaviors without any economic impact during the nascent venturing process. This is problematic if we regard entrepreneurship as an economic phenomenon. Therefore, future research needs to investigate whether behaviors in addition to other explanations also drive economic development (cf. [Davidsson, 2003](#)). In sum, this study gives support to a general theory of entrepreneurship based on the intersection of venture opportunities and enterprising actors as well refining this theory in the nascent stages through venture opportunity variation and its impact on progress in the nascent business start-up process.

This section discusses three main implications for longitudinal entrepreneurship research: (1) increase in sample size; (2) more homogeneous samples; and (3) the issue of time or how long the entrepreneurial process is. These three issues are interrelated and will be discussed side by side in the section below.

The uneven distribution of venture opportunities as well as a high level of venture dissolution in the nascent venturing process suggests that larger sample sizes are an important implication. This research empirically classified two types of venture opportunities. If we want to confirm and extend this classification further it would require larger sample size in order to capture a sufficient number of innovative venture opportunities and to follow them across time. In addition, we need to test and confirm empirical results in different contexts in order to allow more robust generalizations.

Another aspect of sample size concerns the issue of model development. To be able to extend and develop entrepreneurship models we need to have much larger sample sizes if we want to achieve an acceptable level of statistical power across time. The result from this research clearly shows that entrepreneurship is a process that develops across time and that both founding conditions and real time factors affect this process. Models need to include more variables both time varying and time invarying as well as encompass variation in the process as such. Together, more variables and more complex models require larger sample sizes.

Advanced models and complex multilevel research designs also demand a more advanced set of statistical analysis techniques. This study shows that the latent variable framework developed by Muthén and Khoo (1998) handles this complexity well. *As stated earlier, overall improvement in both research design and analytical tools are needed. In support for larger sample size are also common longitudinal problems such as non-compliance, missing data, and sample shrinkage across time.* In addition, if we want to study the nascent venturing process our sample needs to be in the beginning of this process. I made a trade off between including as many cases as possible on the account of homogeneity in initial status. The ultimate study would start at the outset of the entrepreneurial process and follow the venture opportunity from the initial conjecture and forward in time.

Time in itself is a problematic area for process studies. The question is partly related to temporal endurance and partly to how long longitudinal studies should be? The question remains whether even earlier processes before and during opportunity recognition may imprint the venture in the future and how long the imprinting lasts. Bamford et al. (1999) found a diminishing impact across time which is not found in this study. The second

issue concerns how long we need to study the entrepreneurial process. The simple answer to that question is as long as it takes to achieve venture level profit or venture level dissolution and beyond. Scholars in entrepreneurship, however, need to specify what beyond is and is not in order to create an entrepreneurship domain.

Together, these issues reinforce the need for large-scale coordinated research efforts in which it is possible to collect substantial amounts of information from recognition of venture opportunity and forward in time. In addition, this discussion opens up for more creative use of data through; for example, metastudies, mergers of samples, and better use of secondary data.

This study shows that existing theories and models of the nascent venturing process have limited explanatory power especially regarding imitative venture opportunities. However, if we are interested in explaining the emergence of new economic activity in general our research needs to include both innovative and imitative venture opportunities. Therefore, entrepreneurship research needs to create better measurements that capture additional venture opportunity variation and predictors of the nascent venturing process especially for imitative venture opportunities.

The issue of measurements improvement should be developed both in terms of using established and tested measurements as well as in combination with in-depth longitudinal studies of the nascent venturing process. This could be done through a series of in-depth studies during different sequences in the nascent venturing process identified by the survey. Qualitative in-depth results can then be used in the surveys to test their general applicability. The problem is that this strategy requires both monetary and personal resources. Monetary, because of high costs involved in finding and interviewing venture opportunities early in the nascent venturing process and personal because combining in-depth interviews with longitudinal research demands that researchers involved in this process possess a set of capabilities regarding statistical development as well as available time to do in-depth interviews.

Another issue concerns the high number of team initiatives. This study actually used team-based measures as far as possible, which led to some interesting results. The question is whether to rely on single informants or develop designs that incorporate other actors in the process as well, and seek to capture for example social capital with aggregated measures from the entire team instead of only experience from one person. Again this implies that large-scale research efforts are a necessity but the question is whether such a large-scale effort is worth it?

The question is not easy to answer, however, there is one main argument for this approach. It is evident from this research that approximately 40% of

all new venture opportunities are abandoned during the nascent venturing process. This means that a considerable amount of resources are used in the nascent venturing process, which to some extent gives impetus for this type of effort.

This study also generates implications for entrepreneurship research in the area of outcomes and performance. The results in this study show that different sequences in the nascent venturing process and subsequent performance are influenced differently by various factors in the proposed models. Great care needs to be taken developing a set of performance measures that are comparable and capture performance consistent with the theoretical framework that underlies the empirical research (cf. Bamford et al., 1999). *In sum, this study has three main implications for entrepreneurship research: (1) research designs need to be developed in order to increase sample size and reduce heterogeneity in initial status; (2) entrepreneurship research needs to develop longitudinal research designs that capture both development (outcomes) and explanations across time; and (3) statistical analysis need to be consistent with the longitudinal research design. Together these three implications suggest that future entrepreneurship research is to concentrate on a few coordinated large-scale longitudinal efforts instead of many small cross-sectional studies.*

Any answer to the overall research question posed here will be of practical value to at least some of the approximate 283 million people involved in entrepreneurial activity around the world (Reynolds, 2002). It also poses another set of challenges. *The main implication for practitioners is that entrepreneurship and the nascent venturing process could be viewed as a behavioral process and as such it should be possible to train actors to develop knowledge needed to exploit venture opportunities as well as develop entrepreneurial framework conditions that give an effective support both for innovative and imitative venture opportunities.* The following sections cover implications for potential enterprising actors and nascent entrepreneurs already engaged in the nascent venturing process followed by implications for educators.

In terms of advice to individuals considering exploiting a venture opportunity, it seems that the results from this study provide evidence that exploiting and exploring actors should make an effort in order to establish whether their venture opportunity is innovative or imitative because there is variation between the two when it comes to the nascent venturing process. One empirical example here is related to the instrumental social network that has a positive impact during the nascent venturing process for imitative ventures but only in the later stages for innovative ventures (see Table 6).

If we give the advice to nascent entrepreneurs exploring innovative venture opportunities that they should go out and work on their social network instead of being at home developing their product/service concept in order to make that understandable we may actually give advice counterproductive to progress in the nascent venturing process. Instead, if they focus on making their innovation more “real” before they start working on a larger social network they are more likely to be socially reinforced because their closest social network understands and gives their social support also for an innovative venture opportunity.

There are differences in the nascent venturing process between innovative and imitative venture opportunities that need to be developed into a more specific set of advices to entrepreneurs. Table 8 is an attempt to summarize two basic profiles of general advice to actors in the nascent venturing process depending on the venture opportunity they are pursuing.

The general advice to entrepreneurs exploring innovative venture opportunities is that they need to have or acquire all those things mentioned in our contemporary theories. They need to be prepared to explain what their venture opportunity means and to gather instrumental social capital to secure a substantial amount of resources in order to transform the innovative venture opportunity into a profitable new venture.

The advice to entrepreneurs exploiting imitative venture opportunities is simple, know your competitors and use your social network. Imitative venture opportunities come from an optimizing process built on information that is easy to access and understand, which implies that imitative venture opportunities are best exploited as fast as possible.

The “acid” test for a venture opportunity is the act of doing, trying, and being accepted or not as a new venture. The only way to know whether a perceived venture opportunity is a true venture opportunity is to explore or exploit it.

Another interesting finding in this study is how tacit knowledge and formal knowledge are related to different stages in the venturing process. It

Table 8. Advice to Entrepreneurs in the Nascent Venturing Process.

Innovative Venture Opportunists	Imitative Venture Opportunities
<ol style="list-style-type: none"> 1. The team should use codified and tacit knowledge, in the form of formal education and start-up experience 2. Develop a prototype and/or service concept first 3. Develop/use your social network after developing your concept 	<ol style="list-style-type: none"> 1. Know your competitors 2. Use your social network

appears that more generic capabilities coming from start-up experience are far more important in the nascent stage compared to specific industry experience and formal education. This implies that potential entrepreneurs should either acquire these capabilities through a process of trial and error, or surround themselves with a team consisting of persons with previous start-up experience.

This is perhaps too obvious but this study clearly points at the heart of our educational system and the way we teach entrepreneurship and its inability to capture the distinction between innovative and imitative venture opportunities. Venture opportunity variation is seldom discussed and tacit knowledge in the form of industry and start-up experience is seldom acquired by our students. One can argue that the purpose of higher education is not to become an entrepreneur. Nevertheless, few schools today would deny a strong focus on entrepreneurship. Empirical results in this study showed that start-up experience and performance of gestation behaviors are strong predictors of progress in the nascent venturing process. Based on this we can give two main advices to educators: (1) develop curricula including innovative and imitative venture opportunities and (2) train gestation behaviors because generic entrepreneurial capabilities has a positive impact on progress in the nascent venturing process as well as subsequent performance (cf. Samuelsson, 2004).

Table 6 also reports that the instrumental social network has a positive impact on progress in the nascent venturing process as well as on subsequent performance. This suggests that entrepreneurship courses should include students from many different subjects in order to create a dynamic and cross-cultural group of people. *In sum, the educational system needs to develop a curriculum that increases individuals' entrepreneurial capacity to recognize and exploit and explore venture opportunities.*

In sum, entrepreneurship is a large part of our daily lives and an increased knowledge of this process is important for both society and individuals engaged in entrepreneurial processes. So why is it that some venture opportunities are turned into wealth-creating new ventures, through the exploitation process, and some not?

It would be pretentious to claim that this study could give a comprehensive answer to that question. However, it is possible to argue that entrepreneurship needs to acknowledge the existence of venture opportunity variation, systematic differences between the exploration processes of innovative compared to the exploitation process of imitative venture opportunities, and how this process is related to subsequent venture level performance.

Wealth-creating innovative venture opportunities are best exploited by experienced enterprising actors, who are able to balance characteristics of the venture opportunity, resources, and behaviors. Wealth-creating imitative venture opportunities are best exploited in a fast pace, by enterprising actors with start-up experience, who have a high level of competitive awareness.

NOTES

1. General rules of thumb for overall fit are $\chi^2 > 0.05$ and RMSEA estimate < 0.05 (Maruyama, 1998).
2. *T*-values approaches *Z*-values when sample size is larger than 30 and the population standard deviation is unknown (Kinnear & Taylor, 1995; see also Maruyama, 1998).

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THE MECHANISMS AND PROCESSES OF ENTREPRENEURIAL NETWORKS: CONTINUITY AND CHANGE

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Sociologists and anthropologists for many years have appreciated that the nature of exchange which takes place between individuals is important in shaping and influencing behaviour, performance and outcomes (Boissevain, 1974; Bott, 1955; Bourdieu, 1986; Burt, 1992a, b; Granovetter, 1973; Maguire, 1983). Studies in organizational and management behaviour have also shown that networks not only influence the ways in which individuals behave but also impact significantly on the evolution and management of organizations (Ahuja, 2002; Easton & Araujo, 1986; Harland, 1995; Halinen, Salmi, & Havila, 1999; Karamanos, 2003; Nohria & Eccles, 1992; Nelson, 2001). Moreover, the view now becoming widely accepted is that social systems and social networks can influence and impact on economic performance (Arrow, 2000; Granovetter, 1992; Jones, Hesterly, & Borgatti, 1997; Snow, Miles, & Coleman, 1992; Young, 1998).

In the field of entrepreneurship, an increasing appreciation of the utility, application and importance of social networks is also evident. Here, we have

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seen an established research stream emerge from studies that have investigated many aspects of entrepreneurial networks (Hoang & Antoncic, 2003; O'Donnell, Gilmore, Cummins, & Carson, 2001). Essentially, studies reflect a consensus that networks are important because they provide entrepreneurs with an abundance of diverse information and access to a large pool of resources and opportunities (Aldrich & Zimmer, 1986; Carsrud & Johnson, 1989; de Koning, 1999; Hill, McGowan, & Drummond, 1999; Johannisson & Peterson, 1984; Kim & Aldrich, 2005; Singh, Hills, Hybels, & Lumpkin, 1999) that entrepreneurs must engage in networks (Brüderl & Preisendörfer, 1998; Huggins, 2000; Szarka, 1990) and use these "powerful" assets (Elfring & Hulsink, 2002). Evidently, the interactions that can take place particularly within the personal contact network of the entrepreneur – for instance, with business colleagues, family, friends, customers, suppliers and competitors – are seen to be particularly important for entrepreneurship (Johannisson, 1987; Reese & Aldrich, 1995; Szarka, 1990).

Despite the extent of work that has looked at entrepreneurial networks, there are still clear gaps in the literature. Most notable is the need for a greater understanding of the content of network interactions (Barnir & Smith, 2002), the processes within and between network relations, the dynamic and changing nature of networks over time and the relationship of entrepreneurial networks to post-start-up, firm development and growth (Lechner & Dowling, 2003; O' Donnell et al., 2001). These issues are obviously very inter-related and complex. So, the exploration of these issues became the driving force behind a multi-method research project which attempted to probe deeply into network mechanisms and processes over time and to try to lay bare inter-relationships between the entrepreneur, their environmental context and the development of their enterprises. Implementation of the project, and especially the process of comparing the network literature stream with our emergent findings, indicated clearly to the research team that this would be an interesting and helpful approach to making sense of such issues. This chapter represents the outcome of that study. It begins with a discussion about the specific parameters of networks that we are concerned with: changing network content, structure and process over time. Thereafter, an account of the research project undertaken is presented and the findings from our study are discussed. Many of our findings have already been published, and are available for those interested in a blow-by-blow account (see Anderson, Jack, & Drakopolou Dodd, 2005; Drakopolou Dodd, Jack, & Anderson, 2002, 2005; Jack, Drakopolou Dodd, & Anderson, 2004). Here, as we bring all our findings together for the first time, we have tried to avoid weighing down the development of our argument with too

much detail, instead concentrating on pulling together our findings and conclusions into a tighter theoretical conceptualization. This has led to an account, which is less colourful, perhaps, than our usual work, and the voices of our entrepreneurial collaborators are less loud in this chapter, but at the same time are still present, informing and challenging our own emerging understanding. Finally, we attempt to close the loop, by re-visiting the issue of networks in the entrepreneurial process, highlighting generic conclusions of relevance at a fairly universal level, as well as re-specifying those network contingencies which shape the entrepreneurial process. As part of this concluding section, we propose that it is through their network interactions that entrepreneurs negotiate new venture start-up and growth, acting to co-create the environment in which they are embedded.

IDENTIFYING NETWORK PARAMETERS: OBSERVING CHANGING STRUCTURE, CONTENT AND PROCESS OVER TIME

Although the literature addressing entrepreneurial networking is reaching a fairly high degree of sophistication and scope, there are certain critical areas where important questions remain unanswered. Specifically, research into the processes of entrepreneurial networking has been hindered by a paucity of longitudinal studies. Thus, the consideration of change over time is de facto limited. Moreover, accounts of how individuals actually use networks to learn about entrepreneurship, its practices and processes remain sparse. Yet, we know that learning is a social process, so the research gap lies in relating networks, as social contexts to the entrepreneurial learning process. Furthermore, since social relations are fundamental to everyone's life, and emerge, develop and change throughout their life course, people are embedded in social situations that put them in touch with others (Kim & Aldrich, 2005). Consequently, learning is often "located in the relations among actors" (Uzzi & Lancaster, 2003, p. 398). As well as direct learning through network contacts, network transitivity also facilitates learning by one embedded network member, through the knowledge held by a second member, about a third, as shown in Uzzi and Gillespie's (2002) study. Accordingly, in many ways how entrepreneurs go about using their networks and with whom they network may be critical for entrepreneurship and thus warrants investigation. It is to this end that we now consider the shape, content and process of entrepreneurial networking.

Structure, Content and Process

Our argument is that although these parameters may be analytically separable, they are, in practice inextricably interwoven. For example, Larson (1992) argued that entrepreneurial dyadic ties, the building blocks of networks, are built upon a history of preconditions for exchange, including personal and firm reputation, as well as prior relations. These preconditions act to reduce uncertainty, to create mutual expectations and obligations, and to enhance early cooperation. Lechner and Dowling's (2003) cross-sectional study into entrepreneurial software firms found that entrepreneurs of new firms initially used their *social* networks to build a foundation for their ventures. This finding fits with Larson and Starr's hypothesis that in the pre-start-up phase of a venture, entrepreneurs will focus on accessing the requisite resources, through close social ties where possible but also by developing new, initially instrumental, ties. Support for extensive pre-start-up networking activity is also provided by Greve and Salaff (2003) who found that much time was dedicated to network maintenance at this stage in the entrepreneurial process, using mostly extant social ties. De Koning (1999) studied serial entrepreneurs and found that as they move from a basic idea to a solid business concept, they routinely returned to the same tight circle of strong ties. Dialogue with this group of trusted "business friends" was an important part of the validation stage for successful serial entrepreneurs. This group also provided introductions to appropriate providers of resources, for each of the serial entrepreneurs' many ventures.

The identification and organization of resources, especially those not owned by entrepreneurs, are also typically a function of networking (Brüderl & Preisendörfer, 1998; Foss, 1994; Hansen, 1991; Jack & Anderson, 2002; Johannisson, 1986, 1987; Johannisson & Nilsson, 1989; Johannisson & Peterson, 1984; Ostgaard & Birley, 1994). Beyond innovation and collective learning, clustered regional networks have also been extensively argued to provide a whole set of positive externalities, including access to markets and suppliers, shared technological development and infrastructure (Vanhaverbee, 2001). Innovation is increasingly seen to derive from these dynamic environments where firms both contribute to and benefit from, "an adaptive system of collective learning" (de Propriis, 2000, p. 426). Thus, the network environment can be seen to act as a locus of shared idea generation and entrepreneurial creativity. However, rather than geographic clusters giving rise to network ties, some scholars have even argued that it is the need for social ties, especially in the creation of industrial legitimacy for entrepreneurs, which promotes geographic clustering (Shane & Cable, 2002).

This fits well with Uzzi's contention that embeddedness – and the special benefits it brings – are contingent upon “a patterned social structure that interpreted mixed signals and transferred beliefs, values, and resources among firms” (Uzzi, 1996, p. 680). As entrepreneurs attempt to identify resources for their nascent firm, it is the network which signals resource availability. Thus, with whom the entrepreneur has ties could be particularly important.

However, the literature also provides evidence that early *social* ties, often drawn from an immediate circle of family and friends, may be essential to launch the business, but perhaps act as a brake on future development, by restricting diversity (Johannisson & Mönsted, 1997; Pages & Garmise, 2003; *pace* Donckels & Lambrecht, 1997). Yet, a recent Scottish study highlighted the significance of family network ties as being important providers of capital to the nascent firm (Jack et al., 2004). The development of client relationships has also been shown to be a critical process in the very early days of a new venture. Larson (1992), for example, argues that building on dyadic relationships' basis of prior personal and business relations, one firm initiates a trial period of exchange, which creates mutual economic advantage. This in turn leads to rules and procedures for dyadic engagement, clear expectations, trust and reciprocity. Larson and Starr (1993) argue that at this establishment stage, relationships will tend to become multiplex, with an added social dimension enriching previously instrumental ties, and the exchange of high-quality information becoming the major network function. The practical, functional benefit of embedded ties are also well documented, “embedded ties promote, and enable the greatest access to, certain kinds of exchanges that are particularly beneficial for reducing monitoring costs, quickening decision making and enhancing organizational learning and adaptation” (Uzzi, 1996, p. 682). Thus, it would seem that there is some dispute about the benefits and constraints in using social ties for business purposes.

Once an operating foundation had been established, Lechner and Dowling's (2003) found that entrepreneurs tried to increase sales substantially by developing marketing networks and leverage their technological base by co-competition networks. Similarly, Greve and Salaff (2003) found that during this phase much time was expended on network development. They argue that the sample firms in their cross-sectional study were developing new ties to match the practical needs of their firms. Larson (1992) asked a sample of rapid growth firms an open question about what explained their growth and found that, as well as a variety of idiosyncratic internal factors, “uniformly, respondents also reported that certain critical external relationships with

other companies contributed significantly to the entrepreneurial firm's financial success, rapid growth, adaptiveness and innovation" (p. 79). In this way, we see that network change and process vary over time.

From the discussion thus far networks can also be seen as a set of relationships, so that the structure of a network – i.e. the people that the ego relates to – is an important parameter. However, the structure of a network can change and adapt to suit the specific needs of the entrepreneur and his/her venture over time, as can the amount and type of networking that takes place. Network structure has been looked at in terms of the strong tie–weak tie dichotomy first proposed by Granovetter (1973) (Aldrich, Rosen, & Woodward, 1987; Hansen, 1995; Hills, Lumpkin, & Singh, 1997; Ibarra, 1993; Jenssen & Koenig, 2002; Lechner & Dowling, 2003); the homogeneity, heterogeneity and diversity of contacts; reachability, reciprocity, centrality of the entrepreneur within the network; and network size and the extent to which networks are embedded in formal or informal social structures (for examples and further discussion about these features see Birley, 1985; Kim & Aldrich, 2005; Mönsted, 1995). Networks have also been looked at in terms of being a bridging mechanism. For instance, Burt's (1992) structural holes thesis illustrates how individuals can access resources, which are not available through strong ties. Kim and Aldrich (2005) argue that rather than being limited to a small number of people they know directly, entrepreneurs can take advantage of the wider social network in which their ties are embedded. So, strong ties can act as a mechanism for generating knowledge and resources but can also be used to link into the wider social context and provide a mechanism to invoke weaker ties (Jack, 2005). There has also been growth in the number of studies looking at the concept of social capital in relation to networks and entrepreneurship. Traditionally, social capital has been conceptualized as a set of social resources embedded in relationships and the resources available to people through their social connections (Anderson & Jack, 2002; Liao & Welsch, 2003; Baker, 1990; Burt, 1992; Coleman, 1990; Lin, 2001; Kim & Aldrich, 2005). Social capital has been described as a network phenomenon because it resides in the network as connections and interactions that take place between individuals (Anderson, Park, & Jack, forthcoming).

Contextual Contingencies

Networks have also been studied in terms of transnational differences and similarities. For example, Aldrich, Reese, Dubini, Rosen, and Woodward

(1989) examined the differences and similarities between samples of entrepreneurs from the USA (North Carolina Research Triangle) and Italy (Milan). Matched studies were carried out in Sweden (Johannisson & Nilsson, 1989), Northern Ireland (Birley, Cromie, & Myers, 1991), Japan (Aldrich & Sakano, 1995), Canada (Staber & Aldrich, 1995) and Greece (Drakopoulou Dodd & Patra, 2002).¹ While these national samples exhibit a range of similarities, suggesting that “at least some aspects of business networking are generic” (Staber & Aldrich, 1995, p. 443), Drakopoulou Dodd and Patra (2002) found that their Greek sample differed in important ways from other entrepreneurs, in terms of networking. A later study looked at these aspects in terms of Scottish entrepreneurs (see Drakopoulou Dodd et al., 2002) and when compared found there to be divergences in the type of network ties – and hence, one aspect of network structure – across countries. The average proportion of family in entrepreneurial networks, for example, varies from a low of 13% for Japan to a high of 31% for Greece. The Scots reported that just 15% of their closest ties were friends, whereas in the USA this figure was 50%. The USA (where multiple responses were permitted) reported that 65% of their closest respondents were business ties, and the Irish (who were NOT permitted multiple responses) set this figure at 55% close to the figure for Italy and Sweden (54%). By contrast, only 14% of Canadian close ties in entrepreneurial discussion networks were classified as business ties. Another notable divergence from established international patterns of entrepreneurial networking was the finding that only 17% of the possible alter-to-alter relationships was described as being that of strangers. With the exception of the Greek sample (24%), the percentage of stranger relationships between alters has consistently been reported at around the 40% mark.

With regard to network processes, there are also indications that transnational differences act as contextual contingencies. For example, there is substantial variance between the 8 hours reported for Japanese entrepreneurs and the 44 hours per week reported for Greek entrepreneurs. National differences in communication and socialization, and especially the nature of the private–public divide, may lie behind these figures. In general, European entrepreneurs appear to spend around 25 hours a week in networking activities. Assuming that the entrepreneurial working week varies between 50 and 75 hours (figures vary!), this means that between half and a third of the working time of a European entrepreneur is spent in networking activities, a salutary reminder of how very important this topic is. This could be ascribed to what Liao and Welsch (2003, p. 155) call the “normative and mimic forces” which exist in the network environments of potential and nascent entrepreneurs. Zeleny (2001, p. 207) has similarly proposed that

successful network communication leads to the reinforcement of selected, environmentally fit modes of entrepreneurial behaviour. Evolved common cultural values facilitate mutual understanding, and create links of duty, support and co-operation within an industrial district (Biggeiro, 1999). Here, the network acts as an organizing and governing mechanism that provides identity, meaning and resources to its member entrepreneurs. This, in turn allows them to “enact their environments more efficiently” (Johannisson & Mönsted, 1997).

Networks, especially when combined into a clustered entrepreneurial environment, can act to catapult member firms into further growth and development. However, this dynamic is not always positive, with the entrepreneurial context also exhibiting the potential to constrain growth. Venkataraman (2004) makes a powerful argument that environments with very well-established entrepreneurial communities are likely to have moved from the type of well-selected virtuous cycle described above, through virtuous equilibrium, into a vicious cycle. Here, norms and behaviours become entrenched, so that change and innovation are severely restricted, and a “transformative Schumpeterian model of entrepreneurship” precluded (pp. 159–161). Vanhaverbee (2001) provides empirical evidence for this type of cultural constraint in his examination of the construction and home furnishing business cluster, in south-west Flanders. Here, he finds that the potential benefits of adopting a value-constellation strategy are not seized by the cluster, which fail to come together to meet customer needs in innovative ways. Other scholars have made similar observations about the rarity of spontaneous small firm innovation networks, and the failure of “engineered” agency-driven approaches (Hanna & Walsh, 2002, p. 204).

There is some evidence of the enhanced importance of embedded (or “strong”, or “social”) ties to knowledge intensive, idiosyncratic new sectors (Aldrich & Fiol, 1994; Chell, 2000; Johannisson, 1998; Larson, 1992; Liao & Welsch, 2003; Shane & Cable, 2002). The need for private, novel, distinctive and timely knowledge exchange seems to be the reason for this finding. Interestingly, service sector entrepreneurs show greater use of networking than those in manufacturing (Johannisson, 1996).

Conceptual Issues and Understanding Network Practices

So, while we know that networks are important for entrepreneurship, there remains a relative paucity of information about the change process at the level of the networks of individual entrepreneurs and the relationship of

network change to entrepreneurial development. Nonetheless, it seems that how entrepreneurs network, and with whom they network, varies throughout the various stages of the entrepreneurial process. Moreover, given the acknowledged importance of networking, network changes may have implications for entrepreneurial success. Thus, generating a clearer understanding of how networks change and adapt over time and how entrepreneurs use their networks to meet entrepreneurial requirements is crucial to understanding the entrepreneurial process. We, therefore, identify three significant parameters from our discussion of the literature: structure, content and process. Of these three parameters, we have the best understanding of network structure, some comprehension of content and a tentative understanding of process. Table 1 lists some of the key means which scholars have used to make sense of each of these.

Our overview of the literature has not only shown the complexities of studying networks, it has also highlighted the state of knowledge thus far and allowed us to identify a series of questions, which require further research. For instance, how do networks impact on entrepreneurship over time? Can network change be related to entrepreneurial success? How does the entrepreneur manage his/her network for change? and how crucial are networks to sustaining and developing entrepreneurship in the long term? Furthermore, it has also illustrated that if we are to continue enhancing our knowledge of this critical area it is vital that we begin to look at the network process over time.

In order to shed some light on these issues that we undertook a three-stage empirical research project, which combined cross-sectional quantitative and qualitative data collection with a longitudinal study. In this section of this chapter, we will, for the first time, present and analyse the findings of this study, which concluded in late 2004, before attempting to revisit the

Table 1. Network Parameters.

Structure	Content	Process
Type of tie (strong–weak)	Tangible assets: finance, equipment, property	Change through time
Diversity		Network development
Centrality	Intangible assets: knowledge creation and transfer,	Network maintenance
Size	psychological and social “assets”	Bridging structural holes as process
Formality	Relational assets:	Social capital formation
Density	introduction and validation	

extant literature in the light of our findings. First, however, we introduce the methodology, which we utilized, and the regional and sectoral context within which the work took place.

METHODOLOGY

Ego-Centred Discussion Networks

As with many studies of entrepreneurial networks, the approach we adopted focused on the *ego-centred network* of the entrepreneur (Barnir & Smith, 2002; Burt & Minor, 1983; Greve & Salaff, 2003; Knoke & Kuklinski, 1982; Suitor, Wellman, & Morgan, 1997). The ego-centred approach is especially appropriate for samples where those studied have a diverse network, not contained within a single social structure. This is certainly the case for entrepreneurs, as has been repeatedly shown, with their networks containing a mixture of business, friendship and kin ties. Entrepreneurial networks are thus a complex mixture of multiplex social and professional ties, all of which tend to contain both affective and instrumental elements, bonded by trust. We concentrated our study on the five main personal network contacts of our sample, for both the quantitative and qualitative phases of the study, since evidence shows that recall is strong for these relationships (Burt & Ronchi, 1994; Greve & Salaff, 2003). In Granovetter's (1973) terms, we were interested in the *strong ties* of our entrepreneurial sample or, to use Uzzi's (1996, p. 682) concept, *embedded ties*, those with whom entrepreneurs regularly discussed their business and where relationships are tightly coupled amalgams of the personal and the professional. The governing mechanism of such networks is trust: "trust is a governance structure that resides in the social relationship between and among individuals and cognitively is based on heuristic rather than calculative processing... trust is fundamentally a social process, since these psychological mechanisms and expectations are emergent features of a social structure that creates and reproduces them through time" (Uzzi, 1997, p. 45).

The Sample and Setting

The sample frame for the project was derived from the 1997 edition of the Grampian Business Directory, a local government publication, which provides a comprehensive listing of all firms in the Grampian region of the

north-east of Scotland in the United Kingdom. The Grampian region was selected as the locus for the study, because it is an economic environment in which the three authors are well-embedded, because it represents a discrete, geographically bounded area. The selection of a single cognate region was intended to limit the effects of social and economic geography upon the data. Grampian, in the north-east of Scotland, is centred around the City of Aberdeen, the “oil capital” of Europe. The city has a long history of international trade and merchant venturing dating back (at least) to the Middle Ages. It is also, however, physically distant from the central Scotland belt (Glasgow, Stirling and Edinburgh), and has retained a distinct character. Grampian combines some oil-related industries with the more traditional whisky, fishing, food-processing and textiles sectors.

The oil industry, however, is the dominant industrial sector in the region, and the three case-study companies in our longitudinal work all serviced the oil majors. Given the relevance of sectoral factors, a little detail on the industry is required. The UK upstream oil industry is clustered in and around Aberdeen, in north-eastern Scotland; dense ties connect cluster members, although many are also well connected to the wider global oil industry; it is heavily affected by exogenous environmental factors, such as the price of oil and governmental regulation; the constant need to react to these factors, and to extract oil from a very hostile environment, in competition with other “cheaper” oilfields, has placed a premium on innovation.

The sector shows a high degree of vertical disintegration “with over 91% of inputs into offshore oil gathering being procured through the market” and with many of these inputs being non-standard and complex (Hallwood, 1991). Thus, the major operating companies (household-name oil giants) have come to rely on a variety of strategic alliances, subcontracting and project groups with the smaller specialized service companies, so that “service companies have become network nodes around activities fostering the diffusion of know-how and know-that” (Finch, 2002, p. 62). Hallwood (1991) uses transaction cost approaches to analyse the use of closed auctions by the major operating companies, noting that market mechanisms remain important to the field. However, he also found that those service firms invited to bid for contracts in these auctions already had a relationship with the operating firm. Hence, it appears that even when formal market or hierarchical governance mechanisms are utilized, these build upon extant network ties. Finch’s grounded study found that major themes for the sector include the uncertainty of the business cycle – driven mainly by fluctuating oil prices – relationships between operators and service firms, and the

demands of technological challenges (p. 75). Falkenberg, Woiceshyn, and Karagianis (2002) study of knowledge-acquisition processes in the geophysics department of senior oil exploration companies in the US showed that, although specific practices varied, the search for new technologies for such firms was primarily directed externally through various ways of interrogating their professional network. Organizational learning within the oil industry has therefore been shown to have a strong bias towards networked innovation and knowledge acquisition, of exactly the kind identified as potentially important in the literature. The North Sea Upstream Oil sector is therefore an excellent choice for the context of the study, providing a clustered environment rich in intensive network interactions, which we hoped to exploit richness through the development of a detailed understanding of these interactions.²

The Quantitative Survey

The regional business directory details the size and sector of firms and provides some indication of ownership/legal status. The directory was used to generate a total regional population of 786 owner-managed firms, with between 0 and 200 employees. We then randomly selected somewhat over one-third of this population and thereby arrived at our final sample of 271 entrepreneurial firms. All of these firms were contacted in a telephone survey carried out in 2000, and their entrepreneurs were invited to participate in the survey by responding to an extended questionnaire over the telephone. The questionnaire had been previously developed and administered in an earlier series of linked international studies, led by Howard Aldrich,³ so as to permit cross-national comparisons.

The survey generated 68 useable responses, equating to a 25% response rate for the sample. While this is a fairly low response rate, it is not untypical for studies of networks, which entrepreneurs often show a marked reluctance to discuss (Johannisson & Mönsted, 1997). Furthermore, the telephone survey method reduces response rate by requiring that the respondent deals with the survey at a given moment in time, which is especially difficult for busy entrepreneurs.

In addition to harvesting data for quantitative analysis, the preliminary telephone surveys were also used to

- (1) gather basic data about the respondents' enterprises and networks,
- (2) identify and clarify the areas within the topic which needed to be investigated in depth,

- (3) pilot the suitability and relevance of the study techniques, and
- (4) identify suitable respondents for in-depth study who could provide the rich and detailed information required.

The Cross-Sectional Qualitative Survey

The preliminary interviews raised concerns about the feasibility of exploring the issues with all 68 respondents. It became evident that some respondents were more forthcoming and willing to take the time to discuss their situation at length with the researcher. Therefore, 12 respondents were selected who would provide sufficient depth of data to allow the issues to be fully examined. In the following table, specific details about the type of venture each entrepreneur operated are provided along with information relating to the year each activity was established and the individual's background and route to entrepreneurship.

The purposeful sampling method, recommended for qualitative studies, enabled the researchers to use their judgement to select respondents and cases that were particularly informative (Neuman, 1991) and which would help to achieve the objectives of the research (Saunders, Lewis, & Thornhill, 1997). We used information provided during the quantitative survey to identify a set of respondents who, between them, represented the complete continuum of family business relationships, and who also mirrored the wider regional population in terms of gender, age, sector and business size. The 12 entrepreneurs in the sample also exhibited well-developed strong-tie networks and managed a diverse range of growing entrepreneurial firms (see Table 2). Interviews were carried out in 2000.

The Longitudinal Qualitative Study

By coincidence or perhaps as a result of the research team's own social capital in the local entrepreneurial network, 3 of the 12 entrepreneurs interviewed in 2000 had participated in a 1998 pilot study by one of the research team, also on the subject of entrepreneurial networks. For this earlier study, the sample of respondent entrepreneurs were chosen, following recommendations from embedded business contacts, because they were all founding entrepreneurs who continued to be the major owners and managing directors of their ventures. This provided such a rich opportunity for extending the original remit of the overall research project, that the decision was made to develop a longitudinal aspect to the study, by re-interviewing

Table 2. Qualitative Study Respondents.

Respondent	Activity	Established	Background and Route to Entrepreneurship
Nigel	Freight forwarder	1992	Freight forwarding, set-up own business in competition to in-laws
Shaun	Stationery supplies	1983	Took over family business
Grant	Chemical supplies	1981	Accounting and business degree Gradually taking over family business
Mike	Light engineering	1973	New venture based on technical innovation
Bill	Light engineering	1989	University, professional career, then creation of “life-style” business
Barry	Computing services	Various dates	Originally employed in oil industry but then started a number of businesses
Tony	Construction	1974	Management buyout
Mary	Counselling services	1997	Housewife who identified need through own experience
Paul	Computing services	1990	Worked for major oil company allowing him to recognise related opportunities
Stuart	Language school	1995	Various jobs on leaving university Turned hobby into business
Jill	Video production	1985	Sales and marketing, set up business with partner when employer (same industry) went into liquidation
Adam	Manufacturing	1977	Identified a local opportunity

these three entrepreneurs. In 2003–2004, a third round of interviewing duly took place. These entrepreneurs (anonymized as Mike, Paul and Jill,) are highlighted in Table 2.

Qualitative Method

For each of the three interview phases, each respondent was interviewed for between 2 and 4 hours. Interviews were carried out at the respondents’

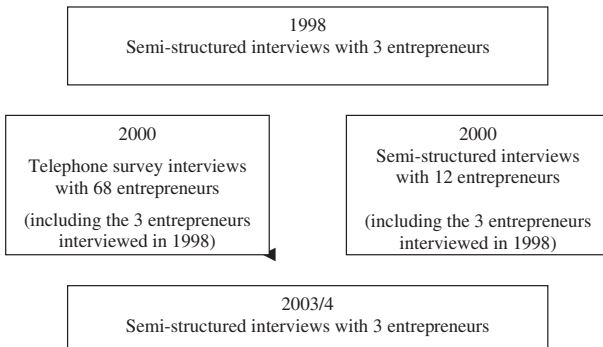


Fig. 1. Project Methodology.

premises, since relaxed and open discussion is facilitated by familiar surroundings (Hill, McGowan, & Drummond, 1999; O'Donnell et al., 2001). The interviews were carried out by two of the researchers. Questions were asked and explanations sought about the types of network ties used, the areas which respondents tended to discuss with each strong tie, the kind of help these people provided, and how often, where and when they interacted with their ties. Respondents were also invited to describe the relationship they had with each strong tie, and to recount the history of these relationships, with special emphasis on their relevance for the entrepreneurial venture. Questions were not asked in any specific order, but were governed instead by the actual situation (Gummesson, 2000).

The final methodology for the extended research project therefore comprised a detailed snapshot in 2000, combining both quantitative and cross-sectional qualitative methods, and longitudinal data collection over a six-year period. Fig. 1 presents a graphic summary of the project methodology.

Quantitative Data Analysis

The internationally recognized survey instrument is especially well suited to eliciting data with regard to network structure, composition and content. We followed Drakopoulou Dodd and Patra (2002), in adding several further questions relating to the content of network exchanges. Simple quantitative analysis was carried out on data derived from the survey, to establish the size, scale and significance of informally linked strong-tie network contacts.

Qualitative Data Analysis

Interviews were transcribed verbatim and examined using well-established qualitative data analysis methods (Glaser & Strauss, 1967; Miles & Huberman, 1994), which have become the accepted approach for handling entrepreneurial network analysis (Hill et al., 1999; Human & Provan, 1996). Specifically:

- (1) The transcripts were read and re-read with notes on emergent themes contemporaneously entered into a research diary (Easterby-Smith, Thorpe, & Lowe, 1991).
- (2) The research diary was reviewed to clarify these emergent themes.
- (3) We revisited the transcripts for initial coding. This revisitation continued until few new insights occurred (Human & Provan, 1996).
Stages 1–3 were carried out by the three researchers separately, to increase reliability (Falkenberg et al., 2002).
- (4) The research team met to present and compare the three sets of initial coding, both with each other, and with a working framework of expectations derived from the literature. Elements of the framework were “retained, revised, removed or added”, as field data provided empirical evidence (Uzzi, 1997). Coding categories were agreed upon by the research team.
- (5) Completing the laborious task of categorization, replete with illustrative examples, we simultaneously continued the development of our framework, in constant comparison to extant theory.
- (6) Finally, we jointly produced an illustrated summary of the major themes and the relationships between them as well as a well-articulated explanatory framework.

While the sample entrepreneurs are not de facto representative of the entire entrepreneurial universe, the purposeful selection of rich examples of strong-tie networks provides useful and rigorous data about strong ties. The methodological techniques provided sufficient depth of data to allow a meaningful analysis, and hence to generate an in-depth understanding of what actually goes on within and between ties. Quotes from the data are used to provide valuable supplements, to add voice to the text and help categorize the data (Wolcott, 1990). We also attempt to link the practices with the background of the respondents, inductively, and demonstrate veracity by telling a convincing story (Steyaert & Bouwen, 1997).

FINDINGS

Our findings are presented here using the framework of entrepreneurial mechanisms. We begin by summarizing the findings relating to network structure, progressing to network content and concluding with network process. Each section begins with findings from the quantitative survey, where relevant, before introducing material from the cross-sectional and longitudinal qualitative studies. We believe this allows us to add layers of richness and depth as we progress through each section.

Structure

To facilitate the flow of our argument, some of the structure-related findings from our quantitative survey have been utilized above, to illustrate the significance of transnational differences as a contextual contingency. To recapitulate, essentially, we found a fairly high percentage of family members in our Scottish sample, and a higher than usual degree of interconnectedness between the entrepreneurs' contacts/alters. This raised serious issues about the utility of these contacts, since very densely connected networks of strong ties have been argued to reduce access to heterogeneous sources of information and other resources (Burt, 1992; Granovetter, 1973; Hills et al., 1997; Ibarra, 1993). We, therefore, investigated the structure of the networks reported to us from a different perspective, to ascertain how homogeneous, and close to the entrepreneur's firm, these contacts were, for all the three types of contact (family, friend and business).

As Table 3 shows, family ties were more likely to be employees of another firm (42%) than were either friends or business associates. A quarter of family strong ties were partners or co-directors in the entrepreneur's venture. Friends were most likely to be entrepreneurs (39%), or employees of another organization (32%). Business ties were reported to be largely partners or co-directors in the entrepreneur's venture (34%) or professionals, classified here as lawyers, accountants and consultants (31%). Fully three-quarters of business associates were internal to the entrepreneur's organization or quasi-internal professionals. This was true for less than a third of family ties, and just 21% of friendship ties. Given the small cell sizes, statistical testing is not appropriate in this case. Nevertheless, the data point to clear trends.

The most detailed analysis, which we carried out as to network structure, however, was based on the 12 semi-structured interviews carried out in 2000.

Table 3. Nature of Strong Tie and Occupation of Strong-Tie Contact.

	Family Ties	Friendship Ties	Business Ties
Percentage of total ties	24	15	61
<i>N</i> = 182	<i>N</i> = 44	<i>N</i> = 28	<i>N</i> = 111
Occupation of strong-tie contact, by nature of tie (in %)			
Professionals	4	7	31
Partners/co-directors	25	10	34
Entrepreneurs	16	39	3
Employed (external)	42	32	22
Employee (internal)	2	4	6
Other	11	7	4
Total	100	99	100
Occupational locus of strong tie contact, by nature of tie (in %)			
Internal/quasi internal	31	21	73
External	69	78	27
Total	100	99	100

These findings are summarized here, and have been presented in more detail elsewhere (Drakopoulou Dodd et al., 2002). Our sample reported a tripartite typology of strong-tie nodes, where the defining characteristic was the nature and intensity of the relationship involved. By nodes, we mean that the ties were clustered around particular affinities that these different ties fulfilled different purposes and each had different levels of intensity. However, what distinguished these ties at a categorical level was the basis of the relationship, rather than the intensity of the tie. We were not able to separate a “friends” category from our empirical data. Rather, all contacts reported contained a varying level of affective tie and were seen to a greater or lesser degree as friends. Instead, we identified a new type of tie, composed of suppliers, customers and competitors.

The three nodes were found to be located at specific points along a continuum of relationship intensity. Family ties were most intense, based on ties of blood or marriage. Business contacts were quite intense and were based on mutual knowledge. Suppliers, customers and competitors were most loosely coupled and the relationship, though still based on trust, was maintained for mutual advantage. Characteristics and consistent outcomes were also ascribed to the relationships located on each of the three nodes.

The second important node was previous business contacts, which had originated from links in other business contexts. These relationships were almost all with people in the same industry or with other entrepreneurs. The original relationships had varied from previous boss to workmate, but the new relationship was one of equal status. This is in spite of an expected tendency for younger entrepreneurs to choose an older mentor. In many cases, relationships had grown closer in the shift to the new entrepreneurial context. Certainly, the relationships were characterized by quite a high degree of intensity, although less so than in the family node and were quite tightly coupled. Respondents met these contacts regularly, even if infrequently, and almost always found a social occasion to round off the business aspect.

The third node was, as we have noted, composed of suppliers, customers and competitors. Suppliers, as well as their formal role of selling goods and services to the entrepreneurs, were felt to be a valuable source of general market information and specific information about the competition. There was also some evidence that a strong relationship with suppliers improved their performance for the entrepreneur's business too. The role of certain customers, with whom the entrepreneur enjoyed a trusting but not especially personal relationship, seemed particularly important in pushing the entrepreneur towards trying out new product and market development. We were surprised to see the degree of mutual support that entrepreneurs gave to and received from the competition. Many of our samples had created a niche market for themselves and this, they felt, allowed them to avoid head-on competition. Instead, they relied on some kind of gentleman's agreement with the competition. This was true whether their niche was defined locally, nationally or internationally.

The longitudinal study added a new dimension to our research when it became clear that our respondents classified their ties, at least some of the time, according to their *quality* or *level*. All the three of our longitudinal respondents emphasize how very important it has been to them to access individuals who are at a very senior level within their network. For Paul and Mike, this is often articulated through top-level members of customer organizations. As Paul argues, "*if a small company is going to have a relationship with a very large oil company then its relationship will probably only survive if its at a relatively high level*". He says, this is especially so if the smaller firm is set on driving radical change in its customers, since very senior support is needed to champion this within the client company. Mike points out that this type of relationship is also beneficial for the alter, since, when they work closely with an entrepreneurial firm, all the alter has to do

to feedback information, or solve problems, is pick up the phone to the entrepreneur.

High-level network contacts offered far more than just enhanced customer relations, however. Mike managed to literally secure a seat at the big boys' table, when he became, fairly early on in his company's life, the Small and Medium Enterprise (SME) representative on an important oil-industry committee. Here, he forged bonds with a number of very senior players in the oil industry, including managing directors of major production companies. These were to continue to act as mentors and friends, and, in one case, to eventually become a member of Mike's board of directors. Paul also, by the end of the study, has a former oil major MD on his board. Jill, however, although, she also serves the oil industry, perceived quality in network contact as a function of prominence and prestige within the local business network, emphasizing that respected lawyers, university professors (!) and leaders of local civic bodies were "the cream of Aberdeen society". She can be seen to have embedded herself in the structures of the local, rather than the sectoral network, and we will argue below that this was one of the key reasons for her business's eventual failure.

The two male entrepreneurs, however, managed very early in their business development, to build strong network contacts with members of the industry, punching well above their weight. There are also a couple of examples in the study where an early contact has also achieved prominence in their own right over time, so that their level within the industry has risen. As we will see in our following discussion of network content, the benefits for our sample entrepreneurs arising from high-level contacts are manifold. In terms of structure, these high-level contacts increased the reachability of the entrepreneur's network and enhanced their centrality to the main game.

The more detailed, richer data from the longitudinal study also showed that, while family had indeed been critical in the phases leading to birth and survival, customer contacts had also been vital, as the nascent firms negotiated to get into business. Mike's start-up strategy involved buying out a part of his employers' firm, and the customers he "inherited" provided a basis upon which his own firm could be founded. Jill's founding team also received support from clients of their former employer, who had gone bankrupt. Paul relied on his existing, extensive sectoral network, although his first major piece of work was indeed for his former employer. While few of these early customers were to prove a long-standing trading relationship, their support of the nascent firm provided essential cash flow in the early days, and a foundation upon which the three entrepreneurs were able to build and diversify. All the three entrepreneurs told us that these earliest

customers turned to them because of a mixture of personal and professional trust: they knew they could be trusted to get the job done.

The longitudinal data also revealed some interesting insights into the issue of formality. As we have already indicated, Mike's participation in a formal oil-industry committee was a critical event in his embedding in the industry. He has also become very senior in a national business organization, and serves on the board of a local university. Paul was part of a semi-formal dinner party group of young, change-oriented oil-industry entrepreneurs for a while, and is now involved in a national social change and leadership programme. Paul and Mike also attended the occasional formal event organized by business development agencies, such as Christmas parties. Jill participated in just about every possible formal civic network available, from local school boards to young enterprise organizations. We can see, then, that there is a certain willingness to engage in formal network structures. However, what was very interesting was the negative attitude, which the two successful male entrepreneurs exhibited towards the inherent formality of these network structures.

When we asked Paul about formal networks, he said "*I don't play golf*". This seemed to be the archetype for formal, traditional organizations, for forced artificial networking. Mike answers similarly in response to a question about surface networks and different types of networks: "*I'm not into the sort of golf network*". Their rejection of formality appeared to relate to its creation of an artificial environment, a locus where the fraternal bonds of their networks risked being compromised by instrumental assumptions and norms. For them, the value of formal network structures rested almost entirely in the opportunities they provided to meet people, with any subsequent interactions, including the possible development of these relationships, taking place in a less formal, more intimate setting.

Content

We have three sets of original empirical findings to report for the content network mechanism. First, we added a series of questions relating to network content to the quantitative survey. This allowed us, using the "*family, business, friends*" typology of the survey instrument, to compare network content across tie-type, thus defined. Second, the cross-sectional qualitative study, from which the nodal typology emerged, showed clear links between network content and node type. Although the intensity of contact varied from very high in the family, to somewhat lower in the customers,

competitor and supplier node, our respondents placed a similar importance, for the *specific purpose of the value generated* within that node, on each node. Each node, therefore, delivered a different type of utility to the entrepreneur, although all three nodes were required for the development of very effective networks. Third, the longitudinal data highlighted the importance of a small group of purchase-ready customers at business foundation and introduced a new dimension to the structural mechanism: level.

First, then, the findings from the quantitative survey for network content, by the type of tie (family, friend, business). Respondents were asked to identify, from a list of 12 possible areas, which management areas they discussed with their contacts and, from a list of seven potential types of help, what type of help was provided. Multiple answers were permitted. We calculated each discussion topic area, and each type of help, as a percentage of the total reported for each of the three groups. Table 4 shows the findings of the analysis into discussion content, and Fig. 2 the findings for type of help.

These data show that, while content discussed with friends varies somewhat from the overall trend, the findings for family and business ties are very similar in many respects. While the small sample size prevents any meaningful statistical analysis from being carried out, the trend is strong enough to be taken seriously. Our respondents were as likely to discuss a range of highly instrumental and functional topics with their family contacts as with their business contacts. Indeed, for some topics, they were more likely to seek discussion with family, than with business ties. These subjects

Table 4. Discussion Content by Nature of Tie.

	Business (%)	Family (%)	Friend (%)
Finding new customers	11.7	9.5	12.9
Selecting suppliers	8	8	6.5
Recruiting employees	8.1	7.6	3.2
Recruiting employees	8.1	7.6	3.2
Seeking finance	8.5	8.4	7.5
Business growth	12.8	11.6	15.1
Business growth	12.8	11.6	15.1
Export possibilities	5.4	3.6	6.5
Accounting and credit management	7	6.9	5.4
Tax issues	6.7	8	6.5
Advertising and promotion	7.8	10.2	11.8
Managing production and operations	7.8	9.5	7.5
Legal issues	7.6	7.6	10.8
Managing staff	8.6	9.1	6.5

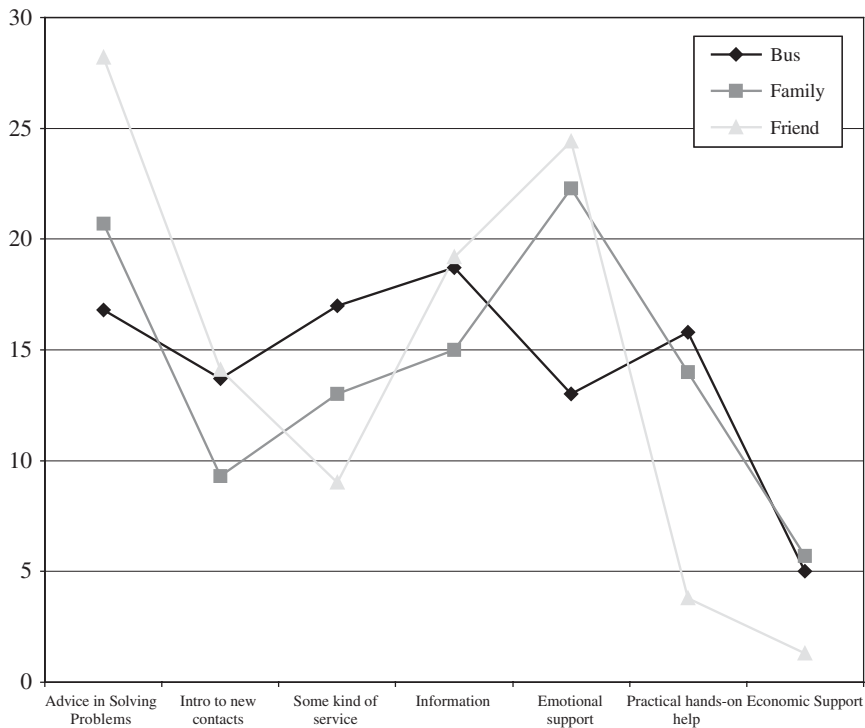


Fig. 2. Type of Help Provided by Nature of Tie.

were found to be tax issues, advertising and promotion, managing production and operations and managing staff. However, in general, the data showed a great similarity between the ways family and business ties were used. The family’s trust in, and affection for, a would-be entrepreneur seems to encourage them to provide essential support which otherwise might not be available. The more resources available within the immediate circle of the entrepreneur, the easier it is for them to carry out this stage of the business start-up process.

When we turn to the type of help provided, again, there is less difference between family and business ties than might have been expected. Fig. 2 shows these findings, which indicate that, as expected, family help is more likely to be emotional support than is help from business contacts, although assistance provided by friends is still *more* likely to be emotional in nature. Family help is also often in the form of advice, problem solving and

information provision. Again, family support for the entrepreneur seems to be almost as practical in nature as that provided by business contacts.

The findings from our cross-sectional qualitative data, once more deepen and enhance our understanding of the three strong ties nodes, introduced during our discussion of network structure. Family ties were very intense ties, and in terms of network content they provided a foundation for the business in a variety of ways. These played the most significant role in entrepreneurial development, with trust presenting a crucial factor to this relationship. As could be expected, family ties were close ties, as bonded links. Family members were used to (1) promote entrepreneurship, (2) identify opportunities, (3) provide financial support, (4) offer practical assistance, (5) provide specialised advice, and (6) as sounding blocks. The entrepreneurs emphasized the reliability of family members.

The category of former business associates played a key role as sounding boards and mentors, business information and advice, idea-validation and introduction to, and legitimation of, new contacts.

The final network node was customers, competitors and suppliers. The key role for this group was the provision of market information, both general and specific, which was used to build up a picture of trends, changes and developments, as well as trying to work out why these changes were happening. Specific information from these contacts was sought out in many areas, including

- (1) from competitors – customer credit-worthiness, equipment and insurance prices,
- (2) from customers – competitor pricing and new business ideas, and
- (3) from suppliers – information about the competition.

The differing resources provided by each of the three nodes are illustrated in Fig. 3. This shows that the family node delivered practical, hands-on support (“*She is the sensible one. She does all the books and minimises our exposure*” (Adam)). By contrast, the business contact node gave access to validation about people (“*He has always been in touch with the business and he had had a major impact on us, identifying the priorities and the people we need to get in touch with*” (William)). The supplier, competitor and customer node provided new product ideas specifically related to the business (“*Our customers make suggestions about what they want. I suppose they really help to point us in the right direction so there’s benefits for all of us*” (Nigel)). Each nodal category was found to be homogeneous in terms of relationship type, and each provided quite specific types of resources. Furthermore, as Fig. 2



FAMILY NODE	BUSINESS CONTACTS NODE	SUPPLIERS, COMPETITORS, CUSTOMERS NODE
Business Instigation	Information about People	General Market Information
Capital Provision	Introductions to People	Specific Information
Hands-on Support	Validation of People	New Product Ideas
Emotional Support	Mentor	Market Ideas
Diversity of Views and Skills	Strategy Development	Avoidance of Direct Competition

Fig. 3. Relationship Characteristics of the Strong-Tie Continuum.

shows, the range of resources provided by each nodal category was quite extensive. Yet, the scope of the ties' potential resources was heterogeneous.

Another very important, and unanticipated, finding emerged from our examination of the content mechanism within the networks of our longitudinal sample. This finding was how important networks had been as agents of entrepreneurial changes. Strategic planning, for example, is often talked about as a form of *conversation* with the network. Specific ideas for new products also come from the customer network. Paul's first product was largely developed in a beer session in an Aberdeen pub, and this story has entered oil-industry folklore, as well as being a foundational narrative for his firm. After the session, in which a number of customer technicians took part, it took Paul's firm just 2 weeks to develop the product. Mike says all his good ideas come from customers. He directly asks the customers exactly what they want, what they do not want and then works out how to deliver it. Then he gears up his resources and capabilities to deliver. In Mike's firm, organizational morphing is driven by specific customer need. He explicitly

says that they avoid building a centre of technical excellence, and then finding work: they “*don’t sell ‘capability’, we’re developing capability to match needs*” (phase 3). Mike’s conversations direct strategic change, which leads organizational change and growth.

Jill does not go outside for ideas or strategic inspiration. She goes outside for advice in solving specific problems, and, at one point, to try and find someone who will tell her very directly how to grow her business. Sorting through ideas and planning specific strategy is the role Mike and Paul keep for themselves, and they bring people into the firm for managerial problem solving. Jill keeps using her outside contact for this very limited role and since she keeps having the same kind of problems – she has the same sort of problems in every interview, for example. The effectiveness of the advice she therefore receives can be questioned.

What we see here is the two successful entrepreneurs generating key ideas for business growth through their network, developing the subsequent new products with their network, creating and validating strategy via network conversations and then arranging for other members of the firm to manage the new relationships thus created. The contrast with Jill, whose business was massively downsized, and all but collapsed, is remarkable. Her network processes are functional, not holistic, and operational, not strategic.

Process

Process is notoriously difficult to capture using quantitative instruments, and the only findings relevant for this network mechanism from our quantitative study relate to the hours expended on network development and maintenance. These data have been reported within our discussion of transnational contingencies and served to emphasize the amount of time – between a third and a half of an entrepreneur’s working life – dedicated to networking activities.

The findings from the cross-sectional qualitative study confirmed, as [Dyer and Handler \(1994\)](#) suggested, the importance of family involvement at the start-up phase. Critical forms of family support as businesses created were promotion of the entrepreneurial concept help with opportunity identification and, especially, provision of finance. For some respondents, entrance to entrepreneurship had been especially facilitated by kin, either through inheritance, or very extensive provision of finance and other resources. Although family help was especially important at the start-up stage, in later years family members outside the business continued to act as key network

contacts and provided a range of assistance to entrepreneurs. Our findings here provide additional support for the network-driven staged model of entrepreneurial processes presented above.

However, it was with the longitudinal part of our study that we anticipated generating the richest findings with regard to the mechanism of entrepreneurial process. Indeed, given the well-recognized research lacuna of longitudinal studies, which study entrepreneurial process in a temporal context, we argue that this aspect of our multi-method study is particularly valuable. It presents a chronological lens to allow us to first chart patterns of network change over time, but perhaps more importantly, by charting networks in their historical contingency, we can thus view network continuity and change from a perspective which enables us to develop a richer conceptual framework.

The nature of networking was seen by our respondents as something natural and unforced. In particular, Paul and Mike emphasized how it is a spontaneous and unaffected part of enterprising. Jill took a rather more formal approach, even targeting key individuals. Nonetheless, even when networking is purposive, all respondents told us that you actually have to like people and to have the right chemistry with them. This, in part, explains their distaste for formal networking organizations, which were seen to undermine the open, honest, social nature of entrepreneurial networking.

We also found that networks change over time, growing, changing and developing according to the entrepreneurs' needs and the direction in which they are taking the business. Networks are adapted in response to these needs and the emergent and changing environment. Networks do not remain static but the core members generally remain the same. As we have seen already, this makes the level, reachability and centrality of early strong contents very important for the future growth of the firm.

Paul and Mike both note that the amount of time they spend on networking varies and increases while they are being the "*architect of each growth phase*". Then it falls off while they grow the company to meet the new opportunity they have created. They put people and systems in place to deal with operationalizing the new opportunity, which becomes routine. Then they set off to begin the next cycle, talking to their customer-networks about opportunities, selling their new ideas at the highest possible level within customer organizations and building relationships.

Entrepreneurs, of course, cannot just be seen as "taking" from their networks: reciprocity in some form is also a key network process. All three of our sample entrepreneurs are explicit in their unprompted comments about the need to give something back to their network. For Paul, especially, what

he is trying to achieve within – and for – his industry is change. Paul, in the early years, articulates the strongest possible duty to be doing what is right for the industry, to be bringing about much-needed change, and he talks about this in really powerful normative language. What we see in terms of reciprocity is of two forms, a generalized version and a specific version. Jill's case exemplifies the specific version in that favours are traded: you scratch my back and I will scratch yours. But Jill's networking has been much less successful than our other respondents. We also noted, how she seemed to have failed to extend and cement new ties. In contrast, our other respondents presented a very general loyalty and obligation to the entire network. But in so doing, we see general networked benefits returning to them, for example as in Paul's increased status. So, just as the network may act as the change agent for entrepreneurs, the entrepreneurs may be seen to create change within their network.

What was also clear from our data was the extent to which normative values were perceived as critical to network entrance and development. Our three longitudinal respondents in particular frequently used expressions such as “*the same philosophy*” “*shared beliefs and values*” (Paul), “*integrity*” (Mike). These shared normative and performance values were used as a hiring criterion for employees, but also as a way of validating the choice of operating partners outside the firm. It was seen as the basis for friendship relationships – for the developing of strong from weak ties.

Contextual Contingencies

From our earlier review of evidence concerning contextual contingencies and their influence upon entrepreneurial networks, we would argue that more detailed work is required, at the micro-level of the entrepreneur, into this area. Specifically, we set ourselves the objective of uncovering some of the relationships between network mechanisms (structure, content and process) and regional/sectoral context. These nuanced and complex issues require qualitative methods to do full justice to their richness, and we hope our study will prove to have been successful in this respect.

There was already some evidence from the work of other scholars to suggest that the oil industry, and the entrepreneurs supporting it, was characterized by a technical and problem-solving approach in doing business. Business ties were seen to develop as a function of this, underpinned by personal affinity and integrity, which had even managed to circumvent fairly formal contractual bidding arrangements. All three of our longitudinal

case-study entrepreneurs mainly served the oil industry at the beginning of our study. One respondent, Mike, began exploiting new opportunities in the defence industry during the period of the study, only to re-enter the oil industry to apply his newly acquired knowledge into this sector also. What was very clear in our findings was that the Aberdeen business environment was composed of two contrasting network structures. The oil industry network is global in reach, confined to one industrial sector and driven by an engineering philosophy. Social capital appeared to be earned by technical expertise, as demonstrated in advanced problem solving. Trust was articulated as being able to rely on someone to deliver a technical solution in a high-risk area and having the integrity not to compromise.

The Aberdeen professional network was geographically bounded to the city and its hinterland, contained many sectors, but was essentially led by graduate professionals, especially the legal professions. Civic duty and pride were the key to winning social capital in this very traditional and conservative network structure, where service to the city was highly valued. Trust was perceived as adherence to conservative norms, and an ability to keep secrets, personal and professional. The structures through which this network operated were largely highly formal and hierarchical. Table 5 summarizes these differences.

Most interesting was the clear antagonism between these very different social structures. All the three respondents were explicit about this and about the negative consequences for the development of the local economy that the resistance to change of the Aberdeen professional network had engendered.

Table 5. Comparison of the Two Networks in the Study.

Oil Industry	Aberdeen Business
Global	Geographically bounded
One sector	Many sectors, led by the trans-professional solicitors, accountants etc.
Social capital earned by technical problem solving	Civic duty and pride wins social capital
Engineering philosophy	Professions and merchants
Dynamic, flexible	Conservative, traditional
Trust = technical competence, reliability of technical solutions	Trust = adherence to conservative, traditional norms, plus keeping secrets
Informal structure	Many formal structures
Like a pub	Like a church

At a micro-level, Jill's story was an embodiment of this problem. She followed her father – a small local retailer who had been very active in local bodies – into the Aberdeen professional network, sometimes attending three or four formal events a week. Very few of these gave her any access to her customer base within the oil industry, and even where oil-industry members attended, they tended to be PR staff, rather than operational managers. Jill was in the wrong network and it really made a difference! She was completely cut off from customers, with no way to gain social and professional capital upon which to build the business' growth. Critically, she could not use her embeddedness in the oil-industry network to develop new product ideas, nor to create strategy. Indeed, her network became used for little more than fire-fighting tactical problems. Although, the business survived for some 15 years – and flourished for some of these, during good times – it was unable to continue growing to achieve a substantial size, and, eventually, was cut back to just three employees, at the point where Jill exited the firm.

DISCUSSION AND CONCLUSION

We began this chapter by reviewing generic and specific networking parameters in the entrepreneurial process. We then reported findings of a multi-method study, which focused in particular on the growth stage of the entrepreneurial process, and uncovered a series of interesting findings, summarized above. By way of discussion, we will return to the level of the generic and attempt to work through the implications of our findings for broader understandings of entrepreneurship.

Our literature review showed us that “network entrepreneurs” – those who use social network contacts to find out about opportunities – recognize many more entrepreneurial opportunities than less social “solo entrepreneurs”. But, what does it mean to network entrepreneurially? Our longitudinal data seems to describe two distinct and different approaches. First, instrumental or functionally purposeful; outcome focused, mechanistic, short termist but logical. Second, fraternal and affective; sympathetic, empathetic, a social alliance of trust, respect, goodwill and rapport. The data describe successful entrepreneurial networking as a strategic practice. But in the short term, there are a number of benefits associated with instrumental networking. Young – and even adolescent – firms, tend by their nature to be resource constrained, so that rapid, sustained growth is unlikely to be feasible based solely on internal resources. Increasing environmental

turbulence demands strategic and operational flexibility and an emphasis on knowledge, process, interaction and change. The entrepreneur's network will therefore play at least an important role for the growing firm. So, how and why do networks change? It seems there is a process, a shift from 1 to 2. Instrumental only lasts for the duration of mutual benefit but may be convertible into a fraternal relationship. So for instrumental networks, change is the norm. As "needs" change, so does the network. These needs may be internal, hence business based, or external in terms of environmental change. Since newer businesses tend to be more flexible, because of the ignorance of newness, there may be a requirement to reconcile and adjust the internal to the external as experience develops. We note that there may be a limit to the operational size of an instrumental network, which may help to explain high churn rates. Such networks may not "develop", but simply change direction. For fraternal networks, we wonder if they do change very much: it may be more a matter of reframing the already established to fit emerging needs but also incorporating some selected new network members when social bonding is satisfied. Jill's failure might be attributed to aspects related to gender but we would argue that this is not necessarily the case. Alternatively, it may be interpreted that because of her work experience and background Jill speaks a "different" language than the industry in which she was located. But Jill had the contacts and was clearly able to break into this network. Instead, she chose a particular networking strategy and this and the ties to whom she decided to connect were unsuitable for the needs and requirements of her specific entrepreneurial venture.

Entrepreneurship is about change, entrepreneurs both create change and respond to change, their natural milieu is movement and change. Clearly, change is ever present at all stages throughout the process and the entrepreneur as an agent of change needs to be able to respond to these changes. The network becomes the mechanism for not only dealing with the environment and the conditions for entrepreneurship but also for coping with change. Therefore, the network and the nature of network contacts can have a significant impact on the start-up, growth and development stages of a venture. Our cross-sectional qualitative study was able to capture some of these movements; we collected the histories of the business development; we saw how they evolved by navigating a pathway through the changing landscape. This in itself is not new, but what we feel this part of our study contributes is a fresh perspective about how evolving ties provide a route map, even a structural pathway for the navigation of change. Consequently, more research needs to be directed towards understanding networks over time.

To try to explain this interaction in space and time, imagine the socio-economic landscape. We are at a fixed point, our beginning or starting point; this is both spatial and time bound, now. This landscape stretches far before us, those parts near us, within sight, are becoming familiar. We know our family, they know us, so these strong links provide a secure base for the expedition. Less clear, but in the middle distance of this imagined landscape are our business contacts. They are familiar, but often from a different context, so in some ways familiar strangers. Their position on the horizon of our emerging landscape is less clear, but as we move forward into the future of the business and forward into less known territory, they signpost this territory for the business because they know those aspects of the terrain. Farther still is the unknown and perhaps unknowable future of the business. This becomes a reality in terms of our customers and supplier, our third node. These particular ties are the future, but they may also create the reality of our business. Until a business idea has been proven in the market place, negotiating commercial support can be difficult.

The longitudinal part of our study added further depth to this developing metaphor. It would be simplistic not to also note that local economic-industrial environments vary considerably in the quantity of resources available as well as in the demand for these resources. Indeed, the resources we notice, and which are potentially available to our use, are very dependent on our social and industrial environment. Consider how our respondents gathered useful information about the environment: they tapped into the experience of other network members. They garnered this experience and reconfigured the networked experience to shape the strategic direction of their firms. We would argue that each network contact presents a subjective (but informed) social construction of what the environment is doing, a presentation of experienced reality. When the entrepreneur responds to this socially constructed perception, what they are doing is to enact the environment as they subjectively understand it. This view and consequential action (enacting) is constructed from the various perceptions within the network. Thus for our respondents, networks as multiple points of contact actually create the environment. Of course, the enacted environment as socially constructed may not represent a full or complete understanding, such is the nature of any social construct. But since we had noted that well-connected individuals had access to more relevant knowledge, this seems to indicate that network contacts can be seen as channels of communication for experience. Thus the more experience that each network contact has, the better and more fuller the entrepreneurs constructed understanding of the environment will become.

To conclude, there is generally a widespread acceptance that economic action is embedded in ongoing networks of personal relationships and that economic goals are typically accompanied by non-economic goals which are related to the social context (Piore & Sabel, 1984; Powell, 1990; Granovetter, 1992; Ring & Van de Ven, 1992; Snow et al., 1992; Jones et al., 1997; Young, 1998; Arrow, 2000; Jack & Anderson, 2002). Our study supports this and clearly demonstrates the relevance of the social context for understanding entrepreneurship. We have argued that the “latent” entrepreneurial environment is a forum, a place to converse and trade simultaneously; a site for both co-location and co-locution. The market, in other words, is the network, and it is made real through the mechanisms of structure (who connects to who), content (what is exchanged) and process (how and when do these transactions take place).

Entrepreneurs may be limited by their ability to recognize opportunities with their social networks, but if able to use social ties effectively and efficiently they can gain returns on their social capital and increase commercial success (Kim & Aldrich, 2005). Here, we have argued that regional and sectoral norms and practices have acted as contextual contingencies to profoundly impact upon the network mechanisms of our sample entrepreneurs. These norms and practices can be equally understood as the habitus within which entrepreneurs are embedded, Boudieu’s habitus, in the sense of shared dispositions to behave in a certain way, is manifested as dynamic bundles of practices. The habitus of the entrepreneurial firm can be argued to be shaped (at least) by its sectoral and regional set of co-created dispositions, but is also impacted by the “stage” in the firms’ development. This stage issue is not simply about the resources the firm needs to access from its environment, and which relationships can make real these latent resources – although this is clearly part of the story. But it is also about how the ties develop over time, becoming multiplex (or withering).

There is a key paradox, here too: the need to live out the norms and routines of the habitus, while simultaneously acting as agents of change. Conformity to the habitus is required so as to develop that all important trust, secure and enhance legitimation, and to invest in social capital. Yet, one of the key activities of the entrepreneur is to develop new “routines”; create new resources (tangible, intangible and relational); re-shape the network as market; and make latencies manifest for others. This is, perhaps, Schumpeterian creative destruction in its widest sense. Our longitudinal study showed that for the two successful entrepreneurs, changing industry practice was an important objective. The role of the entrepreneur within the wider business environment may indeed be just this, as the agent and catalyst of change.

The techniques used to carry out the research allowed us to consider the network and networking activities of our sample of respondents longitudinally. However, we recognize that these methods restrict the generalizability of our findings. It would be interesting if further research was carried out using quantitative techniques and larger samples to test the patterns that we have identified from our study.

NOTES

1. It should be noted that differences within the samples selected (with some studies focusing on young entrepreneurs, some on women, some on urban and some on rural groups) limits the confidence which we can place on these results. Equally, a range of sample construction and questionnaire administration techniques were utilized, which restricts conclusions based on direct comparisons to indications of overall trends.

2. This approach is the opposite of that adopted by Uzzi (1996, 1997), who explicitly chose a conservative environment where economic theory suggested market mechanisms would be the dominant governance and exchange mechanism. Unlike Uzzi, our main objective was richness in data collection, rather than demonstration of the pervasiveness of network exchanges per se, even in the unlikeliest environment.

3. Special thanks to Professor Sue Birley for continuing to let us loose on an unsuspecting world with her version of the international study's questionnaire.

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CHARACTERISING INNOVATION IN KNOWLEDGE-INTENSIVE BUSINESS SERVICES

Mark Freel

It is surely no coincidence that the growing interest in entrepreneurship over the last 30 years paralleled structural changes, from manufacturing to services, in the economies of every developed western country (Acs & Audretsch, 1993). In the United States, for example, manufacturing's contribution to GDP fell from almost 30% to under 23% between 1987 and 2001. In contrast, *business services*' contribution rose from around 20% to more than 27%, over the same period. Similarly, while manufacturing employment fell by almost 1.5 million over this period, employment in business services rose by more than 8 million. Business services alone (ISIC Rev. 3 65-74) now make a greater contribution to US output and employment than do all manufacturing industries combined (ISIC Rev. 3 15-37).¹ Importantly, though there may have been variations in the extent and pace of change, this general pattern was typical across the industrialised economies of Western Europe and North America. Hauknes (1999, p. 5), for instance, cites OECD (1996) data, which shows that employment in business services more than tripled in the 25 years following 1970.

Indeed, while debate continues over the extent to which the growth in business services is accounted for by a growth in outsourcing of previously in-house functions or the sourcing of new specialisations (cf. Karaömerlioglu &

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Carlsson, 1999; Tomlinson & Miles, 1999), it is clear that both manufacturing and other services are increasingly turning to particular business services to perform a number of, both operational and strategic, tasks. This, in turn, has led some commentators to suggest 'an ongoing redistribution of knowledge in favour of KIBS (knowledge-intensive business services) and away from traditional producers and service providers' (Tether & Hipp, 2002, p. 166). In short, financial and business services are widely recognised as among the more dynamic components at the core of structural change (Evangelista & Sirilli, 1998; Strambach, 2001). Following this, one might reasonably argue that business services have been, and continue to be, disproportionately the source of entrepreneurial opportunity in developed economies.

From this perspective, it is more than a little surprising that services have featured so infrequently in our entrepreneurship narratives. This is particularly so when one juxtaposes the apparent determination to view new venture creation as the defining characteristic of entrepreneurship (see, for example, GEM definitions) with the observation that new firm formation rates are typically higher in the service sector than in manufacturing (Acs & Armington, 2005). Regardless, the growing appreciation that entrepreneurship does not solely relate to the creation of new firms (Westhead, Wright, & Ucbasaran, 2006) allows light to be shed on important post-start activities that influence firm growth and development. Central among these activities, and to contemporary conceptions of entrepreneurship, is innovation (Brouwer, 2000). Here again, though, services may have been neglected.

To this end, Drejer (2004, p. 551) repeats a common lament: 'decades after services outdistanced manufacturing from an employment perspective, manufacturing has continued to dominate innovation studies'.² The traditional view of service firms was as innovation laggards. Indeed, it has been common to characterise services, in terms of Pavitt's (1984) classic taxonomy, as 'supplier dominated'. Such firms tend to be small, have no R&D function, are recipients of embodied technologies originating in other sectors, serve price-sensitive customers and follow a technology trajectory unpinned by a logic of cost cutting.

While this caricature may comfortably apply to some service industries (in particular, many personal services), its blanket application has profound implications for economies dominated by services. As Gallouj (2002, p. 144) notes, such a position may 'preclude serious thought (particularly on the part of the public authorities) about ways of energising an area of activity of great importance for the future of firms, industries and nations'. One of the most striking features of the service sector is its tremendous diversity (Tether, Hipp, & Miles, 2001; Evangelista & Savona, 2003). The highly

heterogeneous nature of services should discourage bland generalisations about innovation in services. For instance, recent statistics have shown sharply increasing innovation expenditures within a number of service sectors, even where one employs traditional manufacturing-derived measures (Howells, 2000). In particular, small, KIBS are increasingly recognised as occupying a central position in 'new' knowledge-based economies, as creative innovators in their own right, rather than as mere adopters and users of new technologies. This recognition, in turn, has stimulated significant recent research effort (Wong & He, 2005).

However, at least partially as a result of poor data availability, many studies have been based on very small samples, have been qualitative, descriptive or conceptually driven. Perhaps in consequence, the tendency has been to (over-)emphasise the peculiarities of services and to neglect the potential generality of any findings (Drejer, 2004). Thus, one is presented with a picture of innovation in services, which bears little resemblance to familiar manufacturing models. Yet, these differences are poorly supported by extensive comparative studies. Indeed, where such studies exist (e.g. Sirilli & Evangelista, 1998; Hughes & Wood, 2000; Wong & He, 2005), they tend to point to more similarities than differences in, inter alia: the propensity to innovate, the conduct of R&D, sources of information, and objectives of and constraints to innovation. Unfortunately, such comparative studies have, by and large, limited themselves to outlining broad patterns of innovation, with little attempt made to 'explain' innovation within a more elaborated framework. Moreover, the issue of firm size is often treated haphazardly, given its centrality to innovation studies more generally (Cohen, 1995). For instance, in Wong and He's (2005) comparison of KIBS and manufacturing firms, the average size of sub-sample firms is 24 and 560, respectively. Undoubtedly, such differences will cloud observations. More importantly, the ability of KIBS to specialise and trade in informational or knowledge-based advantages, their entrepreneurial role, is fundamentally bound up in their relative 'smallness'. These are the 'specialised suppliers' and 'science-based' firms of Miozzo and Seote's (2001) taxonomy. One cannot hope to make sensible comparisons with scale-intensive manufacturing firms.

The current paper, then, is concerned with addressing some of these weaknesses and contributing to the growing understanding of innovation in this, often entrepreneurial, sector of the economy. Employing data from a sample of 1,161 small firms, the paper draws broad comparisons between patterns of innovation within KIBS ($N = 563$) and manufacturing firms ($N = 598$). Importantly, in so doing, KIBS are further disaggregated along the lines proposed by Miles et al. (1995). That is, as technology-based KIBS

(t-KIBS; $N = 264$) and professional KIBS (p-KIBS; $N = 299$). However, detailing such broad patterns is merely preliminary. The principal interest of the paper is in identifying the factors associated with higher levels of innovativeness, within each sector, and the extent to which such ‘success’ factors vary across sectors. To this end, the paper adopts an ‘innovation production function’ approach. Such an approach has proved popular in studies of innovation in manufacturing firms and at higher levels of aggregation (see Geroski, 1990; Feldman, 1994; Love & Roper, 1999; Oerlemans, Meeus, & Boekema, 2001; Love & Roper, 2001), and aims at modelling innovation output using a modified knowledge production function (KPF) (Griliches, 1979, 1995). In this way, one is able to identify the marginal contribution of various input factors (and, in the modified version employed here, indicators of competition) to ‘explaining’ innovativeness. Moreover, one should also be able to determine the extent to which such an approach is more or less applicable to modelling technological innovation within KIBS.

THE NATURE OF KIBS

Though KIBS constitute only a small proportion of all services, researchers frequently accord them a significance beyond that indicated by their share in employment or value added (Tether & Hipp, 2002; Gallouj, 2002). For example, KIBS are held to play ‘an increasingly dynamic and pivotal role in ‘new’ knowledge-based economies’ (Howells, 2000, p. 4), as sources of important new technologies, high-quality, high-wage employment and wealth creation (Tether, 2004). Unfortunately, while much of the rhetoric seems intuitively reasonable, one inevitably encounters definitional difficulties in delimiting the specifics of innovation in KIBS, with a variety of, more or less operational, working definitions employed by the academic literature (Wong & He, 2005).

In very general terms, Muller and Zenker (2001, p. 1502) suggest that ‘KIBS can be described as firms performing, mainly for other firms, services encompassing a high intellectual value-added’. However, this merely replaces ‘knowledge intensity’ with the equally indistinct ‘intellectual value-added’. Hauknes (1999), in contrast, explicitly addresses the question ‘what is knowledge intensity’, in terms of ‘conditions for the transaction between the service provider and the service user or procurer’ (p. 6). To this end, he suggests a two-dimensional classification scheme (Fig. 1), wherein knowledge intensity is considered as a function of the relevant knowledge demands on the service provider and the related demands on the service procurer. The greater the associated dual knowledge requirements, the more knowledge

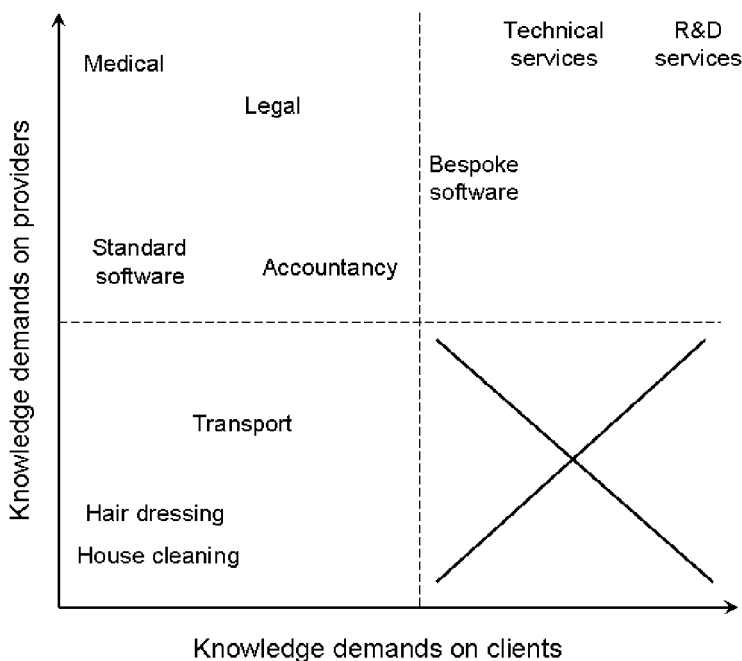


Fig. 1. A Two-Dimensional Conceptualisation of ‘Knowledge Intensity’. Source: Hauknes (1999).

intensive the service is likely to be. Such that, in Fig. 1, knowledge-intensive services are located in the upper-half of the graph, tending towards the right-hand side. ‘[K]nowledge intensity is thus given by the relation-specific requirements to emission, transmission and absorption capacity of the provider and the procurer and the relation between them’ (Hauknes, 1999, p. 7). The value of such a classification scheme lies in the allusion that knowledge intensity is a relative concept (i.e. a matter of degree) and, more importantly, the insistence that it involves the interplay between provider and user knowledge. A recurring theme in the services innovation literature, most especially where KIBS are concerned, is the centrality of client participation in both production and innovation – often termed ‘co-production’ (Gallouj & Weinstein, 1997; den Hertog, 2000; Gallouj, 2002), and we return to this theme later. Unfortunately, as Hauknes (1999) concedes, the main problem is in adequately operationalising such criteria.

Accordingly, a more common starting point is provided by Ian Miles and colleagues (Miles et al., 1995).³ These authors identified three essential

characteristics of KIBS (p. ii):

1. they rely heavily upon professional knowledge,
 - 2a. they either are themselves primary sources of information and knowledge,
 - 2b. or they use their knowledge to produce intermediary services for their clients' production processes, and
3. they are of competitive importance and supplied primarily to business.

In addition, [Miles et al. \(1995\)](#) distinguish between 'traditional professional services' (p-KIBS) and 'new technology-based services' (t-KIBS). The former, it is suggested, are liable to be intensive users of new technology, while the latter are more active in shaping new technologies – though, in common with much of the subsequent research, their concern is principally with t-KIBS. As [Nählinger \(2002, p. 10\)](#) notes, this is a little limiting: 'Very often research on KIBS is in fact research on t-KIBS, making knowledge on KIBS indistinct'. Setting aside p-KIBS may lead to misplaced generalisations and undoubtedly misses opportunities to throw greater light on differences between KIBS 'types' – not least, with regards to the form and function of innovation.

Nevertheless, identification of core characteristics allows the authors to list a number of specific services which exemplify the various 'types' (including non-KIBS – [Miles et al., 1995, pp. 29–31](#)). While the 'lists' still admit some ambiguity and interpretive subjectivity, they provide the inspiration for the development of a more consistent and transparent operationalisation according to standard industrial classifications. Subsequently, identifying KIBS sectors by means of industrial classifications (such as NACE or ISIC) has proven increasingly popular. While industrial classifications may be, more or less, sensitive to between-country differences in application or to wrongly classified firms ([Hipp, 1999](#)), these disadvantages are outweighed by the manifold benefits. Not least among these advantages is the extent to which the ability to clearly define KIBS populations facilitates cross-study and cross-country comparability. This holds even where local partiality limits general consistency. In such circumstances, recognizing exactly how working definitions differ should be relatively straightforward. Moreover, and perhaps most importantly, it should be 'possible to distinguish which types of firms are included in the definition without merely exemplifying' ([Nählinger, 2002, p. 15](#)). This, then, is the approach adopted in the current study.⁴

Specifically, the definition used follows [Nählinger \(2002\)](#) (see also [Nählinger & Hommen, 2002](#)) and is based on ISIC Revision 3. While some

studies operationalise KIBS at the division (i.e. 2-digit) level – to include ISIC 72-74 – these authors more precisely discriminate KIBS by class (i.e. 4-digit). This level of disaggregation allows one to better distinguish between t-KIBS and p-KIBS, and to filter out sectors that are likely to be less ‘knowledge intensive’ (such as non-domestic cleaning activities), see [Table 1](#).

IMPLICATIONS FOR INNOVATION

Having outlined a broad conceptualisation and specific operationalisation of KIBS, we turn now to the implications for innovativeness. However,

Table 1. Working Definition of KIBS Sectors in ISIC Rev. 3.

ISIC	Description	Type
72	Computer and related activities	
7210	Hardware consultancy	t-KIBS
7220	Software consultancy	t-KIBS
7230	Data processing	t-KIBS
7240	Data base activities	t-KIBS
7250	Maintenance and repair of office and computing machinery	
7290	Other computer-related activities	t-KIBS
73	Research and development	
7310	Research and experimental development in natural sciences and engineering (NSE)	t-KIBS
7320	Research and experimental development in social sciences and humanities (SSH)	t-KIBS
74	Other business activities	
7411	Legal activities	p-KIBS
7412	Accounting, book-keeping and auditing activities; tax consultancy	p-KIBS
7413	Market research and public opinion polling	p-KIBS
7414	Business and management consultancy activities	p-KIBS
7421	Architectural and engineering activities and related technical consultancy	t-KIBS
7422	Technical testing and analysis	t-KIBS
7430	Advertising	p-KIBS
7491	Labour recruitment and provision of personnel	p-KIBS
7492	Investigation and security activities	non-KIBS
7493	Building cleaning activities	non-KIBS
7494	Photographic activities	non-KIBS
7495	Packaging activities	non-KIBS
7499	Other business activities n.e.c.	p-KIBS

Source: Nählinder (2002).

some comment on the manner in which innovation is to be modelled is warranted in the first instance. As noted earlier, the approach adopted involves a modified KPF (Griliches, 1979, 1995) or ‘innovation production function’. The attraction of such an approach lies in its simplicity and flexibility⁵: ‘In the KPF framework knowledge creation is modelled as a functional relationship between the inputs of the knowledge production process and its outputs that is economically useful knowledge’ (Acs, Anselin, & Varga, 2002, p. 1074). For analytical purposes the ‘innovation production functions’, which have developed, can be thought to take the general form:

$$\log I_i = \alpha + \beta_1 \log R_i + \beta_2 \log T_i + \beta_3 \log X_i + \varepsilon_i \quad (1)$$

where I is some innovation output measure (e.g. patents or new product introductions), R the direct measure of firm R&D expenditure, and T and X are vectors of internally and externally sourced technological competence, respectively.⁶ In this way ‘... innovation output depends on the presence and volume of innovation resources and the utilisation of these internal and external resources in the innovation process’ (Oerlemans et al., 2001, p. 9). In practice, internal and external technological competences are often provided by the employment of qualified scientists and engineers (QSEs) and technicians, and by external cooperative relationships, respectively. In addition, the version employed here incorporates two measures relating to the nature of the firm’s competitive environment (see below). As Tether (2003, p. 484) notes, ‘the extent to which firms exhibit variety in their behaviours is partially related to their competitive circumstances’ and, importantly, a priori expectations suggest systematic variations in, and in the influence of, such considerations across our sectors. Finally, in line with common practice, firm size and age are partialled out as controls (Table 2).

In terms of the influence of specific variables on the ‘innovativeness’ of individual firms, a simple positive relationship is clearly implied. In other words, increasing volumes and/or incidence of R&D expenditure, highly skilled employees, cooperative relationships, and so on, will increase the likelihood of innovating. However, this is undoubtedly overly simplistic and, in practice, nuances will be more or less apparent. Not least among which, one may anticipate the influence accorded to individual variables to vary across sectors.

For instance, though it is clear that interactive models of innovation are by no means unique to services (Drejer, 2004), a common conjecture sees services innovation as more reliant on ‘soft’ sources of knowledge and technology (such as cooperation with customers and suppliers), rather than ‘hard’ sources (such as R&D) (Tether, 2004). In particular, emphasis is

Table 2. Variables Used in the Analysis.

Variable	Description
Age	Two binary dummy variables for firm age in 2001; categories are 0–3 years; and, 4–9 years. 10 years or older is the reference group
Size	Natural log of the number of full-time employees in 2001
QSEs	Proportion of workforce classed as technologists or scientists
Technicians	Proportion of workforce classed as technicians
Managers	Proportion of workforce classed as managers
R&D expenditure	Three binary dummies for research and development expenditure as a proportion of sales turnover; categories are 1–5%, 6–10% and > 10%; no R&D spend is treated as the reference group
Customer links	Dummy for customer-focused innovation networking; if firm cooperated with a customer for innovation-related activities ‘during the last three years’ coded 1, otherwise 0
Supplier links	Binary dummy for supplier-focused innovation networking; if firm cooperated with a supplier for innovation-related activities ‘during the last three years’ coded 1, otherwise 0
Competitor links	Dummy for competitor-focused innovation networking; if firm cooperated with a competitor for innovation-related activities ‘during the last three years’ coded 1, otherwise 0
University links	Dummy for university-focused innovation networking; if firm cooperated with a university for innovation-related activities ‘during the last three years’ coded 1, otherwise 0
Public sector links	Dummy for public sector-focused innovation networking; if firm cooperated with a public agency (e.g. UK government offices, EU, enterprise companies/agencies, etc.) for innovation-related activities ‘during the last three years’ coded 1, otherwise 0
Larger competitors	Proportion of self-identified ‘serious competitors’ who are larger than the firm
Overseas competitors	Proportion of self-identified ‘serious competitors’ who are based outside the UK

placed on the relationship with customers (Miles, 2001). For example, Gallouj and Weinstein (1997, p. 541) note that ‘one of the fundamental characteristics of service activities, particularly ‘knowledge-intensive’ ones, is client participation (in various forms) in the production of the service’ (see also Gallouj, 2002). Thus one might anticipate a greater relative incidence of customer cooperation in KIBS and a greater marginal contribution to ‘innovativeness’. Moreover, given the implications of Hauknes (1999) conceptualisation (see Fig. 1), one might expect this to apply particularly to t-KIBS.

In contrast, for traditional professional services (p-KIBS), as intensive users of new technology (Miles et al., 1995), suppliers of specialised equipment (particularly ICTs) may make a greater marginal contribution to

innovation. Although this is not to insinuate that these firms are mere passive adopters of such technologies, in the manner envisaged by Pavitt's (1984) 'supplier dominated' category. Rather, p-KIBS may look to suppliers for new embodied technologies that help to extend or enhance service provision (Tether & Hipp, 2002) actively shaping their application – perhaps, ultimately, in the manner envisaged by Barras' (1986) reverse product cycle.

In terms of competitor cooperation, one notes the frequent reference to appropriability concerns and the relative weakness of IPR protection in services (Atuahene-Gima, 1996; Howells, 2000; Djellal & Gallouj, 2001; Tether & Hipp, 2002). As Gallouj (2002, p. 35) remarks, '... the fact that services are not necessarily embodied in technological systems that can be readily appropriated gives them a certain degree of volatility that means they can be more easily imitated by competitors'. From this, one might speculate that competitor cooperation is likely to be both less frequent in services and less likely to be associated with higher levels of innovativeness – as appropriability concerns act as a disincentive to cooperation and joint development. Empirically, however, Wong and He (2005) record a higher incidence of competitor collaboration among KIBS than manufacturers. Importantly, these authors rationalise this finding in terms of relative firm size – the smaller size of KIBS firms leading to less emphasis on market power considerations. As noted earlier, in their sample of Singaporean firms, the average size of KIBS and manufacturing firms is 24 and 560, respectively. For firms of a given size, one might expect the former argument to hold.

With regards to collaborations involving the public knowledge infrastructure, the relationships may be less straightforward. For instance, it is fairly common to observe that, in general, services tend to be poorly linked into wider innovation systems and supporting institutions (Miles, 1999). Djellal and Gallouj (2001, p. 59), for example, talk in terms of 'the negligible role of public organisations ... and universities as sources of innovation'. Wong and He (2005) provide empirical support, noting a significantly lower incidence of collaborations involving research institutes and universities – for KIBS firms relative to manufacturers. Moreover, recent UK evidence suggests that services are around five times less likely to access state-funded innovation support programmes than their manufacturing peers (Green, Howells, & Miles, 2001). The former observation may relate, in large part, to lower levels of R&D expenditure (see below) and to the historical distinction between 'technology-push' innovation in manufacturing and 'need-pull' innovation in services (Howells, 2000). In contrast, the latter is likely to reflect the nature of government support schemes and their inherent bias in favour of industrial manufacturing firms (Green et al., 2001). Regardless,

the general implication is that services will be less likely to collaborate with either universities or public sector agencies and that these institutions will make a less critical contribution to services innovation. However, the introduction to this paper was at pains to stress the diversity of services. The concern here is with a particular subset (KIBS) of the larger heterogeneous category. In this vein, [Howells \(2000\)](#) notes similarities between t-KIBS and high-technology manufacturing in relation to R&D effort and technology intensity, which may influence the propensity to engage in university co-operation. Indeed, the second community innovation survey (CIS) provides some evidence that such activity is more common among technology-oriented services and larger service firms – though still lower than in manufacturing firms ([Green et al., 2001](#)). In sum, one might expect innovation-related cooperative relationships between KIBS and universities to be less frequent than for manufacturing firms. Yet, within KIBS sectors, one may also anticipate that the most innovative firms are more likely to collaborate than the least innovative, with this holding, in particular, for t-KIBS. For public sector agencies, a priori expectations are less optimistic.

In terms of internal resources, one of the most persistent ‘facts’ regarding services innovation concerns the role of R&D. Notwithstanding the recent growth in R&D expenditure in a number of service sectors ([Young, 1996](#); [Howells, 2000](#)), the common view holds that, even within ‘knowledge-intensive’ sectors, service firms will perform less R&D and internal R&D will make a smaller marginal contribution to innovation, than will be the case for manufacturing firms ([Tether, 2004](#)). Interestingly, in [Wong and He’s \(2005\)](#) study, the authors find no difference in the propensity to undertake R&D, between KIBS and manufacturing firms. However, when considering innovators only, they note that innovating manufacturing firms are more likely to undertake R&D than innovating KIBS. This, they believe, ‘is consistent with the argument that services innovation draws less on R&D compared with manufacturing’ (p. 32). Thus, while there may be some equivocation regarding relative R&D expenditures (most especially where t-KIBS are concerned), there appears to be a broad consensus with respect to the diminished influence of R&D on innovation.

In contrast, the importance of human resources – i.e. ‘the labour embodiment of technological change’ ([Drejer, 2004, p. 552](#)) – figures prominently in most academic accounts of services innovation. For [Tether and Hipp \(2002\)](#), this is one of the supposed ‘peculiarities of services’ (pp. 164–165) and holds, particularly, for KIBS. In this vein, [Johnson, Baldwin, and Diverty \(1996, pp. 113–114\)](#) note, rather imprecisely, that ‘in the service sector, knowledge itself is the product and human capital is the dominant

form of capital. A business service in many cases is simply the knowledge of a specialist ... human capital formation and innovation are one and the same in [service] industries'. Recent empirical support is offered by [Wong and He \(2005\)](#). From their study of Singaporean firms, these authors observe significantly higher human capital intensity (proxied by graduate employment) in KIBS, relative to manufacturing firms. This is taken as confirmation of the thesis that professional skills and knowledge, embedded in the expertise of staff, acts as the main source of competitiveness in KIBS. A rare word of caution is suggested by [Hollenstein \(2003\)](#), who, while acknowledging the important role human resources play in services innovation, questions the extent to which this is peculiar to services. This aside, the general implication is that KIBS will be more skill intensive and will draw more heavily on human resources for innovation.

As noted earlier, the current model incorporates two measures relating to the firm's competitive environment. These inclusions are driven by two common observations regarding service firms generally, and services innovation specifically. The first of these concerns the traditional view of services as local or parochial ([Fuchs, 1968](#)). In this view, services are difficult to trade or export and production tends to be co-located with consumption. And, while the increasing internationalisation of some service activities may serve to attenuate the strength of this observation, 'it should be recognised that the 'reach' and diffusion of many services, particularly more sophisticated services, remains partial' ([Howells, 2000, p. 18](#)). In light of this and the frequent association between innovation and export performance in manufacturing samples (see [Roper & Love, 2002](#)), two implications seems clear: firstly, service firms are likely to be less internationalised than their manufacturing peers; and secondly, operating in international markets will make a smaller marginal contribution to services innovation than manufacturing innovation.

The second observation involves the commonly held view 'that service firms face greater competitive risk in commercialising their innovations than manufacturing firms' ([Atuahene-Gima, 1996, p. 40](#)). From this, one might speculate, given considerations of market power and reach, that: firstly, KIBS are likely to see their key competitors as other small (and local) firms; and secondly, competitive intensity (proxied by the size distribution of competitors) is likely to have a stronger negative influence on innovation success in services.

Finally, in most attempts at modelling firm-level innovation, firm size and age are partialled out as controls. That is, even within a highly specific

sample of small firms (such as this), one may anticipate considerable systematic variation in the degree of innovation by size and age. The issue of the relationship between firm size and innovation, for instance, has given rise to the second largest corpus of empirical literature in the field of industrial organisation (Cohen, 1995). Though much of this has been concerned with Schumpeterian market-structure arguments (e.g. Acs & Audretsch, 1987), a longstanding view has held that ‘because development is costly, it follows that it can be carried on only by a firm that has the resources which are associated with considerable size’ (Galbraith, 1956). Indeed, many survey-based studies of small firms point to a positive association between firm size and the likelihood of successfully innovating (usually measured by new product introductions) (see, for example, Freel, 2000; Cosh & Hughes, 2003). However, for services firms, there is some suggestion that the impact of firm size on innovation is far less, and may even be negative in some sectors (Miles, 2001; Tether, 2003).

With regards to firm age, age or, more appropriately, enterprise maturity may act (and is often used) as a proxy for structural development. As Meeus and Oerlemans (2000) note, it is often thought that structural inertia increases monotonically with firm age. Following this, it is tempting to argue, a priori, that the development of systems and procedures, and relatedly enterprise maturity, will have a negative effect upon innovation as the degree of structural inertia builds up. In this way, younger firms are likely to be more innovative, *ceteris paribus*, than older firms. However, a more common argument holds that rather than younger firms exhibiting greater dynamism and flexibility, “[i]n the beginning ... innovation consists mainly of the firm itself as a new product–market combination ... [and] ... in this stage of uncertainty, survival is most important” (Heunks, 1998, p. 263). Heunks further argues that, while new firms are able to accommodate the ‘craftsman–entrepreneur’ and a single product idea, for a firm to grow and develop “... the emphasis has to shift to innovation within the firm and its context” (p. 263). Unfortunately, Heunks’ data fails to support this hypothesis – finding that “firm age does not correlate with any kind of innovation” (p. 267). Similarly, while Moore (1995) finds “innovative activity increasing with age”, this relationship is significant “... for all but innovation in new products and services” (Moore, 1995, p. 13). Accordingly, though both positive and negative relationships between innovative activity and firm age (as a proxy for enterprise maturity and structural development) can be plausibly argued in the abstract, empirical studies tend, at best, to ambivalence (see also Wood, 1997, p. 29).

DATA

The data presented here were collected as part of a wide-ranging 'Survey of Enterprise' in Northern Britain.³ This project drew inspiration from the successful Cambridge studies (e.g. Cosh & Hughes, 2003). However, the rationale for undertaking the project emanated from concerns over the coverage in these influential studies of UK SMEs. For instance, data from the 1997 Cambridge survey included only 146 Scottish firms. Notwithstanding this, the success of the work carried out at Cambridge provided a suitable exemplar from which to build. Full details of the sample and the survey methodology can be found elsewhere (Freel & Harrison, 2006). For present purposes it is sufficient to note several limitations. In the first instance, and for practical reasons, the sample over-represents large SMEs and under-represents micro-firms. Moreover, certain sectors were over-surveyed and others, correspondingly, under-surveyed to reflect industrial policy objectives and identified regional specialisations (DTI, 2001). In short, the sample does not perfectly represent the population of SMEs in 'Northern Britain'. However, when this caveat is borne in mind (i.e. that the survey did not seek to represent, in any isomorphic manner, the notional population), then the legitimacy of the subsequent analyses should not be compromised.

In very general terms, 5,200 manufacturing firms and 7,472 business service firms were surveyed, providing 597 and 748 useable responses, respectively (response rates of 11.5% and 10%). Although the response rates are a little disappointing, the sample appears statistically reliable. That is, from an SME manufacturing population of approximately 15,180 firms, the 597 responses represent a 3.9% sampling error at the 95% confidence level. For services, given an approximate SME population of 40,555 firms (SIC (92) divisions 52.7, 64, 72-74, 92.1 and 93 only), the 750 responses represent a 3.5% sampling error at the 95% confidence level. In most survey research, error levels typically lie between 2% and 6% with 95% confidence limits (Oerlemans et al., 2001).

Fundamentally, the current concern is with 'explaining' innovation within a particular set of business services. As such, analysis of the manufacturing sample is intended to provide a broad comparison only. Clearly, one would expect patterns of innovation to vary across manufacturing sectors, and exploration of these issues was the subject of an earlier paper (Freel, 2003). Moreover, this earlier paper provides a detailed description of the sectoral disposition of the manufacturing sample. Though the same level of detail is unnecessary here, some general appreciation of this sectoral distribution is needed to make sense of the comparison. To that end, it is important to note

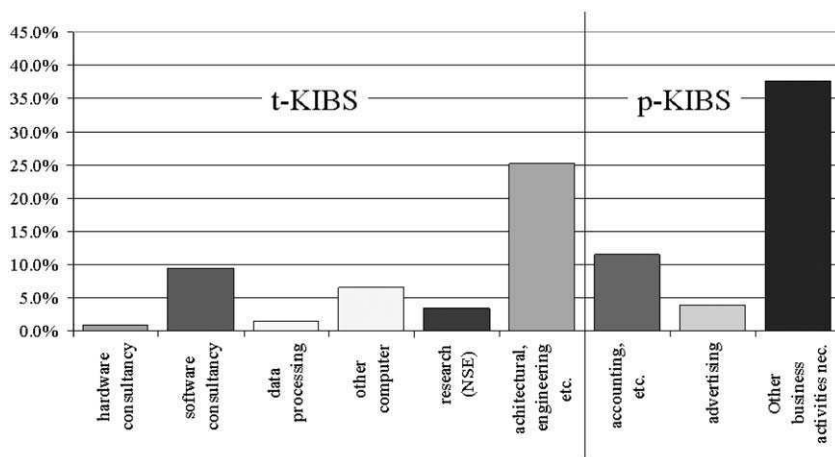


Fig. 2. Sectoral Distribution of Sample KIBS.

that this is not a high-technology sample. Low- and medium-technology sectors (e.g. textiles and metal fabrication) dominate with less than one-fifth considered ‘science-based’ – reflecting the industry structure of the survey regions.

Beyond this consideration, the specific focus on KIBS required that 185 non-KIBS be set aside (see Table 1). The remaining firms are distributed across the various KIBS sectors as outlined in Fig. 2.

Some Brief Comments on ‘Innovativeness’

Ian Miles (2001) points to an evolution in research issues: where once researchers asked ‘do services innovate?’ – ‘that services can be innovative is no longer an issue’ (Miles, 2001, p. 16) – the emphasis is now, more commonly, on investigating ‘how innovative are services?’ and ‘which services are most innovative?’ The interest of the current paper is primarily with the latter question (paraphrased as ‘what factors are associated with innovativeness in services?’). However, some brief comments on the former is not without merit.

To this end, Figs. 3 and 4 chart innovation outputs for t-KIBS, p-KIBS and manufacturing firms. In Fig. 3 the concern is with ‘innovation intensity’. That is, the extent to which newly introduced products/services and processes contribute to sales turnover. Two things are immediately apparent from the figure: firstly, both p- and t-KIBS are innovative (only around 25%

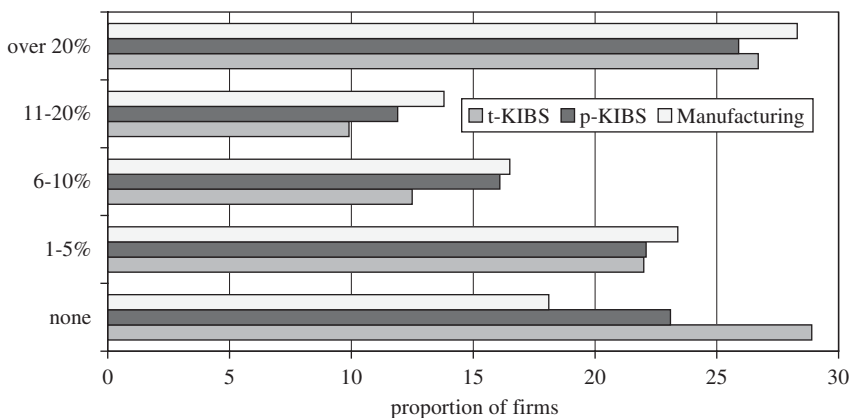


Fig. 3. Proportion of Turnover from Services/Processes Introduced in Last Three Years.

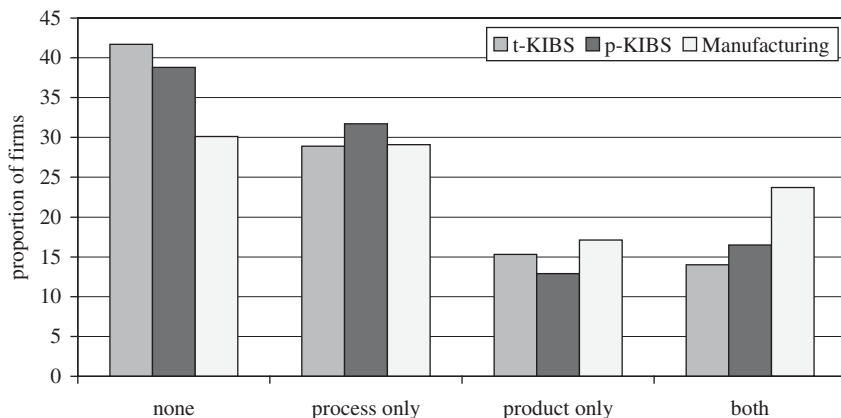


Fig. 4. Product and Process Introduction in Last Three Years.

report no innovation-derived turnover in the given time period); secondly, though KIBS are innovative, they appear to be less so than manufacturing firms. Here, the principal difference is in the proportion of firms reporting new products/services or process making no contribution to sales. This observation is statistically significant, though at the margins ($p = 0.091$).

A similar picture is painted in Fig. 4. KIBS are clearly innovative, when measured by the simple introduction of at least one product/service or

process innovation.⁷ And, as before, the data suggest that they may be less so than manufacturers. In addition, there is some suggestion of a greater focus upon process innovation in p-KIBS (and a concurrent lower level of product innovation), but the differences are relatively small. Again, the most marked differences appear at the extremes of activity. That is, KIBS appear significantly ($p = 0.002$) more likely to have introduced no innovations and less likely to have introduced both product and process innovations. Nonetheless, the general pattern in Figs. 3 and 4 is unmistakable: a majority of KIBS are innovative, by standard measures, and a substantial minority are highly innovative. Moreover, though KIBS appear to be less innovative than manufacturing firms, the differences are less than one might have anticipated. Accordingly, rather than investigating absolute or relative levels of innovation in KIBS, one may more usefully wonder why some KIBS firms are more innovative than others, and whether the critical success factors vary across sectors. Essentially, this is the focus of the analysis presented below.

Multivariate Analysis

In general terms, the aim of the current paper is to model KIBS innovation within a more elaborated framework – to identify the marginal contribution various factors make to ‘explaining’ innovativeness. In so doing, an ‘innovation production function’ approach is adopted. Such an approach is common in studies of manufacturing firms (e.g. Freel, 2003; Oerlemans et al., 2001; Love & Roper, 2001). Accordingly, an ancillary concern is with the extent to which the utility of the approach transfers to the study of innovation in KIBS.

Estimation of the production functions takes the form of three ordered logit equations (Table 3), in which the dependent variable records the introduction of new processes, products/services, or both. The most innovative firms are those who had introduced both product/service and process innovations during the period covered by the survey. The least innovative are those firms who had introduced neither product/service nor process innovations.⁸

Logistic regression, in common with all varieties of multiple regression, is sensitive to high correlation among the independent variables. However, various tests for multi-collinearity (using correlation matrices, and multiway frequency analysis (Tabachnik & Fidell, 2001)) suggest little problem in this respect. For manufacturing firms and both ‘types’ of KIBS firms, cooperation with customers and cooperation with suppliers exhibits the highest bivariate correlation. Yet, such a relationship may be sensibly anticipated

Table 3. Ordered Logit Models of the Probability of Introducing New Services and Processes.

Independent Variables	t-KIBS 'Innovativeness'	p-KIBS 'Innovativeness'	Manufacturing 'Innovativeness'
Log size	0.218 (2.585)	0.319 (6.226)*	0.458 (27.629)*
Age (0–3 years)	0.492 (0.791)	–0.042 (0.004)	0.526 (1.009)
Age (4–9 years)	–0.593 (3.096)***	–0.039 (0.015)	–0.050 (0.051)
R&D (> 10% turnover)	0.517 (0.921)	0.512 (0.581)	0.989 (7.861)*
R&D (6–10% turnover)	1.096 (3.270)***	0.638 (2.001)	0.590 (2.912)***
R&D (1–5% turnover)	0.112 (0.121)	0.441 (2.029)	0.560 (7.973)*
Technicians	1.739 (4.466)**	0.043 (0.003)	1.248 (2.547)
QSEs	1.766 (4.631)**	1.003 (1.352)	2.023 (4.412)**
Managers	1.277 (4.815)**	–0.965 (4.636)**	–0.020 (0.003)
% Larger competitors	0.429 (1.106)	1.085 (5.199)**	0.134 (0.263)
% Overseas competitors	1.063 (3.102)***	0.564 (0.763)	0.348 (1.301)
Customer	0.364 (1.011)	0.649 (3.326)***	0.553 (6.500)*
Supplier	0.721 (4.257)**	0.741 (4.804)**	–0.198 (0.840)
Competitor	–0.083 (0.043)	–0.273 (0.473)	–0.298 (1.220)
Public sector	–0.483 (1.232)	0.412 (1.083)	0.814 (10.232)*
University	1.279 (5.561)**	–0.150 (0.098)	0.017 (0.004)
Nagelkerke R^2	0.222	0.262	0.218
–2 Log-likelihood	432.877	469.459	1122.109
χ^2 (16 df) ^a	43.285*	56.745*	102.609*
N	189	204	451

Note: Figures in parenthesis are Wald χ^2 test statistics.

*Significant at 1% level;

**Significant at 5% level;

***Significant at 10% level.

^aFull model versus constant only model.

and in no instance does the level of correlation give undue cause for concern or indicate redundancy (a Spearman's ρ of around 0.4). Moreover, as the data in Table 3 indicate, all models appear reasonable predictors of 'innovativeness' – significantly improving upon 'constant only' prediction at the 1% level. On the whole, the models seem to have a number of satisfactory properties. Moreover, in simple terms, the innovation production function approach seems as appropriate for modelling innovation in KIBS as it is for manufacturing. The t- and p-KIBS equations report pseudo R^2 s of 0.222 and 0.262, respectively. These compare favourably with an R^2 of 0.218 for the manufacturing sub-sample – and are broadly in line with similarly motivated studies.⁹ In terms of the paper's ancillary concern, there would appear to be some merit in applying techniques derived from studies of

manufacturing innovation to the analogous process in KIBS. Though this statement is not made without qualification, I return to the issue at the end.

In terms of specifics, a cursory glance at the data in [Table 3](#) may serve to confirm expectations regarding the relative role of various innovation inputs in KIBS and manufacturing firms. For instance, any level of R&D expenditure is positively, and significantly, associated with ‘innovativeness’ in the manufacturing sub-sample. In contrast, higher proportions of all three ‘high-skill’ categories are positively, and significantly, associated with ‘innovativeness’ in t-KIBS. However, the devil is in the detail and the picture is considerably more complex.

In the first instance, though any level of R&D is associated with higher levels of innovativeness in manufacturing, R&D expenditure of between 6% and 10% of turnover also marks the most innovative t-KIBS. Similarly, while the various high-skill categories are positively associated with innovativeness in KIBS, a greater proportionate employment of QSEs is also significantly associated with innovativeness in the manufacturing sub-sample. In contrast, neither R&D expenditure nor high proportionate employment of skilled-labour is significantly associated with innovativeness in traditional professional services. Indeed, employing relatively more professionals and/or managers is significantly, and negatively, associated with innovativeness in this sub-sample.

In terms of external ‘inputs’ (in the form of innovation-related cooperation), the data again present some mixed results – in view of a priori expectations. For instance, cooperation with customers is positively associated with innovativeness in manufacturing and p-KIBS firms, but not in t-KIBS firms. Given that the measure of innovation adopted privileges product innovation, the former observation may not be surprising. However, particularly in light of [Hauknes \(1999\)](#) schema, the latter is considerably more so. One of the most persistent ‘stylised’ facts of services innovation is the centrality of customer participation ([Gallouj, 2002](#)), which is thought to hold particularly for t-KIBS. Yet, if one reflects on [von Hippel’s \(1978\)](#) classic discussion of customer-active and manufacturer-active paradigms, the observation may be less remarkable. In essence, [von Hippel \(1978\)](#) suggests that customers are more likely to drive innovations in circumstances where the ‘technology’ is relatively mature and their familiarity with it is well established. Where these do not hold, manufacturers are likely to be the main sources of innovation. For the manufacturing sub-sample this is fairly clear – mature industries dominate the sample. With respect to KIBS, one might reasonably suggest that the relative role of customers may reflect their ability to articulate needs and wants and,

consequently, to engage in service development. For example, in the case of software, one can envisage customers more readily deferring to providers after initial specifications are drawn. In contrast, a more iterative and collaborative approach to advertising seems likely. The lower level of technological complexity may afford customers the opportunity to participate in service development on an ongoing basis, not easily afforded by the more technologically complex t-KIBS.

Following this line of argument, the relative role of other cooperation partners is intriguing. Though customer cooperation is not significantly associated with innovation in t-KIBS, both suppliers and university cooperation are. Indeed, the pattern of innovation in t-KIBS seems similar to that anticipated for Pavitt's (1984) 'science-based' firms. Pavitt suggested that in science-based firms, process technology is largely developed in-house or sourced from suppliers, while product technology is extended internally 'based upon the rapid development of the underlying sciences in universities and elsewhere' (Pavitt, 1984, p. 362). Though the balance of 'soft' and 'hard' internal sources may not be quite as Pavitt envisaged, the view that t-KIBS share many similarities with high-technology manufacturing seems reasonable (Howells, 2000; Hipp, Tether, & Miles, 2000). Moreover, the most innovative t-KIBS are significantly more likely to perceive international competition for their services.

For p-KIBS and manufacturing the relationship between external cooperation (beyond customers) and innovation is largely in line with expectations. That is, innovativeness in p-KIBS is positively associated with supplier cooperation, while innovativeness in the manufacturing sub-sample is positively associated with cooperation involving public agency. Indeed, as a whole, the pattern of statistical associations relating to p-KIBS is suggestive. For instance, the lack of significant and positive observations relating to internal resources may incline one to view such firms as, more or less, supplier dominated – in the manner intended by Pavitt (1984). Pavitt proposed that such firms 'make only a minor contribution to their process and product technology' (p. 356). However, in Pavitt's manufacturing-oriented taxonomy, supplier-dominated firms are primarily concerned with developing cost-reducing process innovations for price-sensitive customers (which explains the primary role of suppliers). In p-KIBS it is less likely that products (i.e. services) and processes will be as easily and practically separable (Tether & Hipp, 2002). Moreover, in the original conception, the products of supplier-dominated firms are consumed by myriad end users (in industries such as textiles and food and beverages). Clearly, a fundamental characteristic of all KIBS is that they sell, largely, to other businesses. In this

way, many of them are literal specialist suppliers (if not as outlined by Pavitt). The most innovative p-KIBS are also more likely to view their main competitors as firms larger than themselves. Competition against larger firms is unlikely to revolve solely (or largely) around price/cost considerations, but require greater focus upon service quality and differentiation. Here again, one can envisage a greater role for customers than implied by the supplier-dominated designation.

Finally, in terms of the 'control' variables, the data suggest that innovativeness is positively associated with firm size – significantly so for p-KIBS and manufacturing firms. There is little evidence that the impact of firm size on innovation is less in KIBS, and there is no evidence that it may be negative (Miles, 2001; Tether, 2003). Similarly, there is limited evidence that firm age has any influence on firm-level innovativeness. The data relating to t-KIBS do hint at a negative relationship between firm age and innovativeness. That is, discounting those firms less than three-years-old (i.e. the period for which new product and process introductions were recorded), younger firms were less likely to be among the most innovative. The observation is at the margins of statistical significance and is unlikely to lend itself to easy rationalisation. Though one may speculate that the greater technology complexity may require longer lead and payback times and it is this which the data reflects.¹⁰

At this point, it is also worth noting what the foregoing analysis does not address. To that end, the models were constructed to investigate the factors that distinguish the most innovative from the least innovative firms *within* each sector. The concern is not with the distinguishing characteristic of the most innovative firms *across* the sectors. For instance, in noting that the most innovative p-KIBS are not marked by proportionately higher levels of skilled labour, this is relative to the least innovative p-KIBS and not to manufacturing firms. Though not reported here, the data indicate that p-KIBS are likely to employ a greater proportion of technicians, QSEs and professionals/managers, than their manufacturing peers.

In addition, noting statistically significant associations says little about the strength of relationship between variables. Statistical significance relates to the degree of confidence one may have in making inferences to a population. It is not synonymous with significance in its colloquial sense. Rather, the strength of association more appropriately concerns consideration of marginal effects (the effect of a unit change in a given independent variable on the probability of being in a dependent variable category). To this end, Figs. 5 and 6 chart the marginal effects (on the probability of being in the 'most innovative' category) for external and internal 'inputs', respectively.¹¹

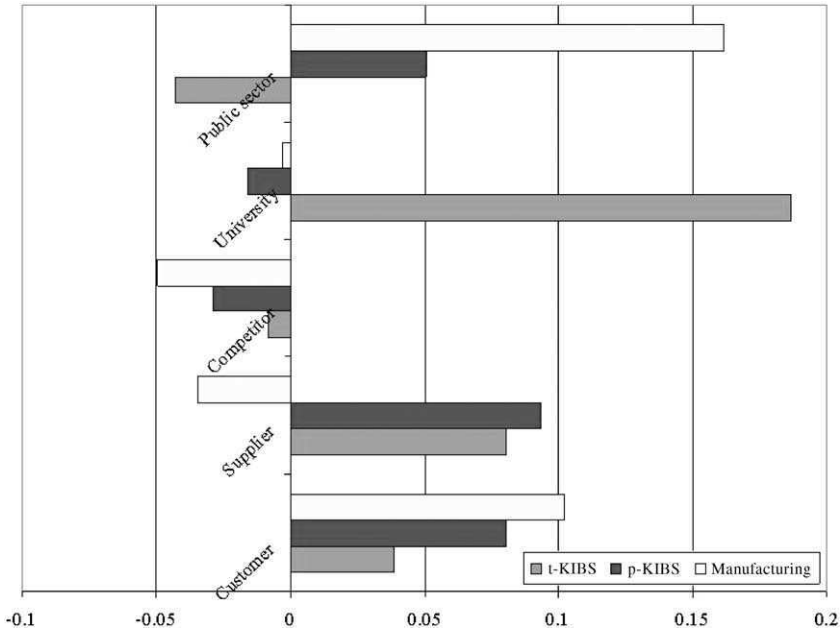


Fig. 5. Marginal Effects and the Influence of External Cooperation on ‘Innovativeness’.

Fortunately there seems to be considerable convergence between statistical significance and marginal effects – though this is by no means perfect or inevitable. Nevertheless, charting marginal effects makes the relative influence clear. For instance, Fig. 5 is emphatic in underlining the relationship between university cooperation and higher levels of innovativeness in t-KIBS. While supplier cooperation is positively and significantly associated with innovativeness, its influence is substantially less than university cooperation. Similarly, for manufacturers, cooperation with the public sector leads to the greatest single increase in the probability of being ‘most innovative’. Though customer cooperation recorded a higher degree of statistical significance, its influence on innovativeness is less. For p-KIBS, the pattern is straightforward: supplier cooperation makes the greatest apparent marginal contribution to ‘explaining’ innovativeness – though the difference is small in relation to customer cooperation. Finally, though not a statistically significant observation, the relatively high negative parameter estimate relating to public sector cooperation in t-KIBS may give pause. Though not reported here, the data suggest that t-KIBS firms were marginally *more*

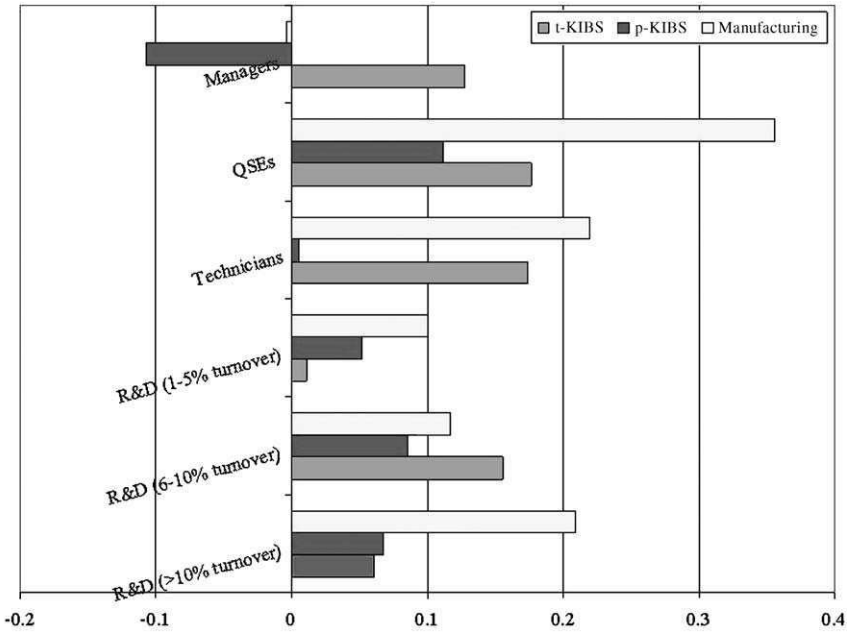


Fig. 6. Marginal Effects and the Influence of Internal Resources on ‘Innovativeness’.

likely to have engaged in innovation-related cooperation with public sector agencies (than manufacturers or p-KIBS). Accordingly, it is difficult to make a case for manufacturing bias in the selection of partners (as Green et al. (2001) make more generally). However, one may certainly wonder about the efficacy of the support given to t-KIBS.

Turning to internal ‘inputs’, again, Fig. 6 is unambiguous; for example, in illustrating the relative importance of all high-skill categories to innovativeness in t-KIBS or the influence of QSEs in manufacturing. For manufacturers, technicians also seem to ‘matter’ (though this was not statistically significant). In the case of p-KIBS, the positive effect of QSEs (again, not statistically significant) is certainly non-trivial and should caution against blithely dismissing the role of internal factors in p-KIBS innovation simply on the basis of (lack of) statistical significance. However, the positive effect of QSEs is mirrored by the negative impact of proportionately more managers and professionals. Greater ‘managerialism’ does not appear to benefit p-KIBS – at least in terms of innovation.

With regards to R&D expenditure, the picture is straightforward. Allowing for statistically significant observations alone, one might be tempted to argue that R&D mattered more for manufacturers – or, strictly, that R&D expenditure was a better discriminator of innovativeness in manufacturing than in KIBS. Consideration of the relevant marginal effects broadly supports this view. However, it is important to note that expenditures in the range of 6–10% of turnover appear better able to discriminate between innovativeness in t-KIBS. Unfortunately, due to differences in measurement of the variables, it is not possible to make simple comparison between the marginal effects of R&D expenditure or cooperation and those relating to skilled labour.

Finally, it is important to note that the purpose of the foregoing analysis is not to dismiss the value of identifying statistical significance. It is far from it. Simply, that it is not uncommon to have results, which are both statistically significant (in the sense that one may be confident in making inferences about the population) and effectively trivial (in the sense that their marginal contribution to ‘explaining’ the given phenomenon is negligible). Consideration of both paints a clearer picture.

CONCLUDING REMARKS

This chapter was concerned with shedding a little more light on an ill-understood activity within an entrepreneurial part of modern economies. Though KIBS often embody many of the characteristics of the archetypal entrepreneurial firm (in terms of their reliance upon knowledge-based advantages, their intermediating roles, their flexibility and so forth), they have seldom taken centre stage in entrepreneurship research. This neglect has been compounded by a tendency to caricature service firms as innovation laggards – overlooking the tremendous diversity within services and the considerable contribution made by KIBS.

Specifically, the analysis sought to model KIBS’ innovation within a multivariate framework, to enable the identification of ‘critical success factors’ (or, at least, those factors which may distinguish the most, from the least, innovative firms). To this end, innovation in technology-based KIBS seems to bear a close resemblance to innovation within science-based manufacturing – at least in terms of what ‘matters’. That is, highly skilled (technical) labour and cooperative relationships with supplier and universities appear to foster higher levels of innovation. In contrast, professionally based KIBS have more than a little in common with supplier-dominated

manufacturing – at least to the extent that supplier cooperation and firm size are positively associated with innovativeness. However, one also notes the important role played by customers, which suggests the need to exercise caution when reaching for easy caricatures. It seems unlikely that p-KIBS are mere passive adopters of (technological) innovations, but also assist in the active shaping of client innovations.

An ancillary aim of the study concerned the extent to which the manufacturing-derived methods employed were applicable to this specific sub-sector of services. On the whole, the methods work as well for the services sub-samples as for the manufacturing sample. Following this, one is tempted to suggest that innovation in KIBS varies (from innovation in manufacturing) by degree rather than by kind. Indeed, the increasingly blurred distinctions between the manufacturing and service components of industrialised economies serve to underscore this position. Appreciating sector differences and exploring them with consistent tools should throw further light on these important processes.

NOTES

1. All data based upon OECD, DSTI (STAN Industrial database, 2003).
2. By 2002, the share of the service sector amounted to about 70% of the total value added and accounted for about 70% of the total employment in most OECD economies (Wöfl, 2005).
3. Though the term 'KIBS' has been around longer (Miles, 2001), the report by Miles et al. is often considered something of a touchstone.
4. The discussion of the benefits of industrial classifications and the final classification draws on Johanna Nählinder's (2002) excellent review of KIBS 'state of the art and conceptualisations'.
5. The unit of analysis can equally be the firm or larger geographic areas where innovating firms reside.
6. As indicated by Eq. (1), the functional form taken is linear in the logarithms of the variables (i.e. Cobb-Douglas in the jargon of economists).
7. Product/service innovations are 'new to the industry'; process innovation may be 'new to the firm' only.
8. Broadly, this is the data presented in Fig. 4. While strictly speaking this does not imply a clear ordering, consideration of the data suggests that the independent variables vary systematically across the groups and in the order suggested.
9. For example, disaggregating data by Pavitt (1984) sectors, the models reported in Oerlemans, Meeus, & Boekema (1998) 'explain' between 16% and 33% of sample variance.
10. Other explanations spring to mind, but this is perhaps the most obvious.
11. Mean marginal effects are used for continuous variables.

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A RESOURCE-BASED VIEW ON ORGANIC AND ACQUIRED GROWTH

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Understanding the sources of business growth is central to both the fields of entrepreneurship and strategy. This is a logical endeavor given the positive macro-level outcomes of firm growth, such as the creation of new jobs, an increase in tax revenues, the provision of innovations, and overall economic growth (Wennekers & Thurik, 1999; Davidsson, 2005). At the same time as the macro-level outcomes, business growth has determinants on the micro-level. Indeed, the majority of firm-growth studies have examined a long list of internal factors as predictors of growth, such as the founding team, founder's prior knowledge and education, access to capital and financing, and/or networks. In particular, these studies argue that the firm's resources are likely to influence its growth, and its increased size will have implications on what kind of management skills become crucial (e.g. Chandler & Hanks, 1994; Flamholtz, 1986).

Despite the increase in the amount of research into this topic over the past decade (cf. Wiklund, 1998; Delmar, Davidsson, & Gartner, 2003) the outcome of these reviews is, however, rather disappointing. It appears that despite the increased research efforts, relatively little of solid, generalizable

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knowledge has emerged. It has been suggested elsewhere that part of the explanation for this is likely that much research has overly simplistically treated business growth as *one* phenomenon (cf. Davidsson & Wiklund, 2000). In reality, there are several different modes and patterns of growth. For instance, Delmar et al. (2003), using numerous measures of growth, found seven different types of growth patterns. These different modes and patterns require different explanations, and they have different implications on the societal and organization level.

In this chapter, we will focus on one particular aspect of the multi-faceted nature of business growth, namely the distinction between organic (or internal) and acquisition growth. While there are exceptions (Niosi, 2003; Delmar et al., 2003), few empirical studies of firm growth have dealt with this important distinction. More precisely, we will start from an empirical observation concerning organic versus acquired growth. The observation is that there is *a very strong empirical relationship between the size of a growing firm on the one hand, and what proportion of growth is acquired on the other*. It turns out that in the smaller firms almost all the growth is organic, while the converse is true for growth firms in the largest size classes. The purpose of this chapter is, first, to try to make theoretical sense, within the framework of the resource-based view (RBV) of the firm, of the strong firm size → acquired share of growth relationship. Second, we will test hypotheses based on our theoretical reasoning on two independent sets of data.

THE EMPIRICAL OBSERVATION

While the social sciences do not make “scientific discoveries” of the kind made in the natural sciences, the empirical patterns revealed in Tables 1a and b struck us as coming close to that. Consider especially the “organic as percent of total” columns. They show an astonishingly clear and strong relationship between the size class of firms and the proportion of total growth that is organic. The effect is actually so strong that large firms defined as “high growth” in terms of total employment growth actually *shrink* quite markedly in organic terms (cf. Davidsson, 2005, p. 153; Davidsson & Delmar, 2006).

Before taking the argument any further, however, let us first explain the data on which this finding is based. The data set includes all Swedish firms – independent or affiliated with a company group – which were in operation and had at least 20 employees in November 1996. The displayed analyses include only “high-growth” firms, defined as *those ten percent of the cases*

that display the highest annual average absolute employment growth. Organic growth was computed as $total\ employment_{(t)} - total\ employment_{(t-1)} - employment\ in\ establishments\ acquired\ during\ this\ year$. A more elaborate description of the data set can be found elsewhere (Davidsson & Delmar, 2006; Delmar et al., 2003).

Because growing firms change size classes over time we display two versions of the analysis. The first analysis (Table 1a) includes only the high-growth firms that were in existence the entire period and classifies those by their 1987 size. The second (Table 1b) includes all high-growth firms in the data set according to the above definition, and classifies them by their final

Table 1a. Total and Organic Growth for High-Growth Firms in Existence the Entire 1987–1996 Period by Their Initial (1987) Size.

1987 Size Class	No. of Cases (<i>n</i>)	Cumulative Total Employment Growth	Cumulative Organic Employment Growth	Organic as Percent of Total
0–9	35	4,461	4,182	93.7
10–49	91	11,617	7,797	67.1
50–249	188	32,705	17,422	53.2
250–499	37	11,913	2,339	19.6
500–2499	73	50,492	3,542	7.0
2500 +	13	26,750	–13,082	(–48.9)
Total	437	137,938	22,200	16.1

Table 1b. Total and Organic Growth for High-Growth Firms Existing in 1996 by Their End (1996) Size.

1996 Size Class	No. of Cases (<i>n</i>)	Cumulative Total Employment Growth	Cumulative Organic Employment Growth	Organic as Percent of Total
20–49	342	8,124	7,963	98.0
50–249	532	44,320	34,208	77.2
250–499	127	22,340	12,497	55.9
500–2499	127	57,752	15,682	27.2
2500 +	25	52,728	–10, 310	(–19.6)
Total	1,153	185,264	60,040	32.4

size. Both analyses yield the same result. First, the organic share of total growth declines monotonically with increasing firm size. Second, this relationship is very strong, in both cases indicating a share close to 100% for the smallest firms and a negative figure for the largest firms.

However, not even a very strong empirical relationship gives in itself very clear implications. Merely stating that something varies with firm size is unsatisfactory for most purposes. In this case a key question is “what does size actually represent?” One thing that follows from increased size is the accumulation of resources. Therefore, resource-based theory may provide some further insights into this phenomenon. In the following section, we will discuss how smaller and larger firms’ differential resource situation may affect their mode of growth, and develop some hypotheses based on this discussion. We will then test these hypotheses on two other data sets. The reason for switching to new data sets is twofold. First, the data set we have been referring to so far does not contain all the variables necessary to test the resource-based hypotheses. Second, if the same observations can be made in other data sets, this would suggest a higher generality of the firm size → acquired share of growth relationship.

THEORY AND HYPOTHESIS DEVELOPMENT

The Relevance of the Resource-Based View of the Firm

The RBV of the firm has become one of the central views used in contemporary strategic management and entrepreneurship research. Its starting point is that the firm is made up of a bundle of resources. These individual resource attributes affect firm performance (Wernerfelt, 1984; Barney, 1991). Although there is some discussion on this matter (cf. Rugman & Verbeke, 2002; Lockett & Thompson, 2004), Edith Penrose’s classic book “The theory of the growth of the firm” (1959) first proposed the resource-based approach to management. Additionally, as the title indicates, she focused on the growth of the firm, and in particular the role of resources. Specifically, she writes:

... a firm is more than an administrative unit; it is also a collection of resources the disposal of which between different uses and over time is determined by administrative decision.... The services yielded by resources are a function of the way in which they are used – exactly the same resources when used for different purposes or in different ways and in combination with different types or amounts of other resources provides a different service or set of services. ... As we shall see, it is largely in this distinction that we find the source of the uniqueness of each individual firm. (Penrose, 1959, pp. 24–25)

This unique proposal to the view of the firm and its subsequent treatment in studies of growth have made Penrose's (1959) work so important (Galunic & Rodan, 1998; Teece, Pisano, & Shuen, 1997; Grant, 1991). Idiosyncrasies in her view include the understanding that the same resources can be combined in different ways to create multiple "services"¹ and that these "services" are heterogeneous across firms and a key determinant of competitive advantage. That they are path-dependent and thus difficult to imitate and change remain central themes in RBV. The same goes for the importance of knowledge, experience, and entrepreneurship in the development of "services" and thus competitive advantage. While RBV indeed has developed since it was introduced by Penrose in 1959 (cf. Galunic & Rodan, 1998; Eisenhardt & Martin, 2000), the treatment of the relationship between resources and firm growth remains most extensive and elaborated in the original work. Therefore, Penrose will be our theoretical nucleus.

Penrose makes important contributions to the process of firm growth. She argues that these are based on entrepreneurial abilities, or "entrepreneurial judgment" to use her words, in order to detect new expansion opportunities and to understand how resources should be recombined in order to develop new and more valuable "services". Much like Schumpeter's (1934) classic definition of entrepreneurship, Penrose stresses that the new combination of resources is central to growth:

The productive activities of such a firm are governed by what we shall call its 'productive opportunity', which comprises all of the productive possibilities that its 'entrepreneur' sees and can take advantage of. A theory of the growth of the firm is essentially an examination of the changing productive opportunity of firms. (Penrose, 1959, pp. 31–32)

At this stage it might be worthwhile to draw a distinction between two quite diverging views of RBV. Both of these are present in Penrose's thesis, as illustrated by the first Penrose quote above. The first view, and most common in empirical studies of resources and growth, is that it is the static *possession* of resources that is imperative for growth. One example of this is Miller and Shamsie's (1996) study of the Hollywood film studios. Their measures included such things as the number of contracts held and the number of Academy Awards won. In another example of research in this spirit, and more closely related to small firms, Chandler and Hanks (1994) looked at a long list of resources, such as possession of low-cost labor, possession of ultramodern equipment, etc., and their individual effects on growth.

The second view, which although widely espoused is seldom used in empirical studies, looks at the *utilization* of resources. Although research usage

is evident in the first quote from Penrose, this application of RBV is admittedly hitherto underused in research (Helfat, 2000; Johnson, Melin, & Whittington, 2003). Wiklund and Shepherd (2003) are one exception to this though. They examine the usage of knowledge-based resources in the growth of small and medium-sized businesses. One explanation for the lack of studies using this utilization position is the lack of data and difficulty of measurement. We will draw upon these two different approaches in our discussion of organic and acquisition growth.

Organic Growth

Edith Penrose makes the fundamental assumption that managers try to maximize the profits of the firm via growth (Lockett & Thompson, 2004). Further, it is the managers, not the owners, who are in control of the operations of the firm. Thus, it is the role of managers to use the available resources in order to maximize firm profits. This is the logic behind organic growth within this aspect of RBV.

In order to achieve profitable growth, the management of the firm must be observant of the limitations and possibilities made available by its “productive opportunities”. These opportunities are based on both the resources internal to the firm and the changes in the environment of the firm. It is both these changes in the environment and the changes in the stock of resources which create new profitable value, eventually allowing the firm to grow.

Accordingly, the growth of the firm can be seen as stemming from two different resource-usage activities. The first is the search for novel uses of the existing resource bases. All resources controlled by a firm are never fully used. There is always some resource slack as only a limited number of resources can be used profitably at a given time. This slack creates potential for expansion. In order for these idle resources to produce useful “services” they may be combined with other available resources that are not occupied for other purposes. Penrose also discusses the need for firms to attempt to discover more about the potential uses of resources via research and other types of proactive searches. She represents this by arguing that managers frequently reflect “There ought to be some way in which I can use that” (Penrose, 1959, p. 77). Finding new productive uses of ready-held resources is thus one usage of resources.

The second usage of resources for organic growth is by the application of the entrepreneurial judgment of the managers. This is done by the subjective evaluation, (i.e. the usage of management resources), of market conditions.

The evaluation comes from the belief in how much and what the firm believes it can sell to the market. We agree with Mosakowski (1998) that it is possible to consider this entrepreneurial judgment as an intangible resource (cf. Davidsson, 2005, pp. 117–118). Based on the discovery of changes in customer preferences and innovation, managers choose to engage in the recombination of existing resources to satisfy this perceived demand. Hence, opportunities for expansion are limited to the extent to which a firm sees opportunities, is willing to act on them and is able to respond to them with their own resources (Penrose, 1959). Opportunities are, as earlier pointed out, based upon the subjective knowledge of the manager. It is up to the environment to accept or reject the soundness of the judgment of the manager (Penrose, 1959). Thus, the management of the growth of the firm can also involve discovering new market opportunities and changing and using the existing resources to match these opportunities.

Central to the argument about the importance of the usage of resources is that the successful matching of perceived opportunities with combinations of resources is more important to growth than is the size of the resource stock per se. Consequently, firms with greater ability to recombine existing resources and perceive opportunities, (i.e. use their resources), are likely to exhibit higher organic growth rates than those with lesser ability. The capacity of a firm to see opportunities and being able to carry out the new combinations of resources can be empirically captured in a firm's degree of entrepreneurial orientation (EO) (Lumpkin & Dess, 1996; Wiklund, 1998). EO refers to the entrepreneurial dimensions of the firm's strategic orientation, comprising the three dimensions risk-taking, innovation, and proactiveness. The concept was first introduced by Miller (1983) as an attempt to capture firm-level rather than individual-level entrepreneurship. Innovativeness reflects the firm's tendency to try novel approaches to using resources. Proactiveness refers to the usage of firm resources to act on perceived future wants in the marketplace. Risk-taking can be connected to the willingness to employ resources where outcomes are unknown, e.g. very dependent on subjective managerial perceptions and not objective knowledge, in Penrose's terms. Using EO as the empirical indicator of the quality of the firms' entrepreneurial resources, we are able to state the following hypothesis:

Hypothesis 1. EO has a positive effect on organic growth.

Let us for a moment return to the empirical findings presented in Tables 1a and b, which formed the point of departure for the present research. They suggested a strong relationship between the size of a growing firm on the one hand, and what proportion of growth is acquired on the

other. Resource-based theory would suggest that this effect occurs because the smaller firms are more focused on the use of their limited resources relative to large firms. That is, small firms are more entrepreneurially oriented. While this observation has not been directly tested in the EO literature, Pettus (2001) and Lichtenstein and Brush (2001) do imply that small firms must first upgrade their existing resource bases prior to acquiring new resources, as would be the case of acquiring another firm. Lee, Lee, and Pennings (2001) also argue that small firms engage in this type of resource recombining behavior in order to avoid competing with larger firms in more traditional ways, such as on the basis of price, while Hitt, Hoskinsson, and Ireland (1990) state that smallness is connected to risk-seeking behavior.

Acquired Growth

Penrose makes the distinction between internal and external growth, i.e. between organic growth and growth through acquisitions and notes that these may be very different processes:

Herein lies the really significant difference between internal and external growth. ... Successful acquisition of another firm may require no more than financial ability, bargaining skill, aggressive initiative, and a sense of strategy. ... This stands in sharp contrast to the program of internal expansion where managerial planning and execution cannot be avoided in the very process of expansion and other internal bases for expansion are usually necessary. (Penrose, 1959, pp. 188–189)

According to the arguments of RBV based on the *possession* of resources as the source of growth, growth by acquisition is more likely to take place in large firms than in small firms for several reasons. First, as indicated by the above quotation, mere access to financial capital, which probably is greater among large firms, may be an explanation for acquisition growth. Access to capital is frequently a major issue for small firms, and not necessarily in the context of acquisitions. For example, Tsang (1998) argues that small firms are typically more resource-constrained than are the larger firms. This lack of financial capital has been discussed frequently in the literature on small firm behavior and growth (cf. Storey, 1994). Winborg and Landström (2001) actually find that small firms often use bootstrapping as a means of acquiring operating resources. Thus, given the difficulty of small firms to acquire financial capital, acquiring another firm might be beyond the realistic scope of financial resources of the small firm.

Second, the effectiveness of an acquisition is dependent on the ability of managers to integrate the two firms (Cartwright & Cooper, 1993). Small

firms generally have a shortage of managerial resources available (Aldrich & Auster, 1986) and these current resources are oftentimes already fully employed in the existing operations of the firm (Penrose, 1959). Indeed, Penrose (1959) argues that the largest barrier to growth is access to managers, what Marris (1964) calls the “Penrose effect”. Carrying out an acquisition would additionally place further demands on a manager’s time, based on evaluating acquisition targets and managing any eventual acquisition. Thus, small firms have less managerial slack available to complete proportionally large increments of growth, such as those implied by acquisition. The larger and more complex the expansion, the more managerial “services” could be expected to be required per unit of expansion (Penrose, 1959, p. 207), which should also restrict small firms’ expansion through acquisitions.

In summary, what the above suggests is that small firms are less likely than large firms to grow by acquisition primarily because this rarely is a feasible alternative for them. It should be noted that there is a distinction here. Many of the key arguments for differences between large and small firms are based on the theoretical findings of the liabilities of smallness. Yet there may be other reasons, such as access to production staff or access to salespeople. Therefore, we find it pertinent to test both the actual size effects, which would encapsulate the plethora of liabilities of smallness, and the two proposed characteristic differences of access to financial capital and access to managers. Together, these lead to the following hypotheses:

Hypothesis 2. Firm size has a positive effect on acquisition growth.

As the underlying reason for the effect in Hypothesis 2 is that larger firms would have more resources the following more detailed hypotheses can be derived and tested where more detailed data is available:

Hypothesis 3. Access to financial capital resources has a positive effect on acquisition growth.

Hypothesis 4. Access to managerial resources has a positive effect on acquisition growth.

In this way, RBV is able to shed some light on the high share of acquisition growth among large firms as was presented earlier (Tables 1a and b). The theoretical explanation of this empirical phenomenon would be that larger firms have greater choice between different modes of expansion and to large extent *choose* acquisition growth.

METHOD

In order to test the different hypotheses, we used two different samples. We did this as we feel that finding similar results over a diversity of samples is a good indicator of robustness. Additionally, we posed different questions to each of the samples during the data collection, thus being able to measure different components of our research questions. We will first describe the entire data collection method for each of the data sets before we begin to discuss the analyses. To test the first two hypotheses, data collected from a large sample of small Swedish firms during three consecutive years (1996, 1997, and 1998) were used. Information concerning the independent variables was collected in the first year and size data in each of the three years.

In the first year a telephone interview was conducted, followed by a mail questionnaire concerning the independent variables. One year after the initial study, a shorter telephone interview was conducted where size data were collected. This procedure was repeated the next year. This makes the study longitudinal, and more precisely, a panel study.

The sample was stratified over the Swedish equivalents of ISIC codes. Small firms from specific manufacturing, service and retail industries were selected. The sample was also stratified over the standard Swedish size brackets of 10–19 and 20–49 employees. Further, the sample was stratified over the firms' growth rate so that the share of high-growth firms was over-represented in the sample for both size brackets and all industries. Data were collected from the firms' managing directors because of their knowledge of the companies operations.

Out of the 808 firms included in the initial sample, 630 were interviewed by telephone in April and May 1996, resulting in a response rate of 78%. Next, 465 firms (a response rate of 58%) returned completed mail questionnaires. These 465 firms were approached again for a telephone interview one year later. A total of 447 firms responded, which equals 96% of the remaining firms from the previous year and 55% of the original sample. In 1998, this procedure was repeated, resulting in 420 respondents, equaling 94% of the remaining firms from the previous year and 52% of the original sample.

Penrose (1959) points out that her theory addresses the firms that actually do grow. It is possible that shrinkage is not simply negative growth and that size reduction may require other explanations. Further, a subsidiary may have access to resources beyond its own boundaries, via the company group, which could bias results. Therefore, subsidiaries and shrinking firms were excluded from the analyses. This reduces the sample size to 223 (28% of the original sample).

Of these 223 relatively small independent firms in the sample, 35 acquisitions were reported during the two years of study. These 35 acquisitions were performed by 30 different firms, indicating that some firms have made more than one acquisition.

Measures

Entrepreneurial Orientation. Two slightly varying scales for measuring EO have been frequently applied to empirical research. The original scale was developed by Miller (see Miller & Friesen, 1982), and then slightly modified by Covin and Slevin (1986, 1989). In the present study, Miller's original EO scale is used. This scale consists of eight items dealing with the three dimensions of innovation, risk-taking, and proactiveness (see above). The Cronbach's Alpha value of the scale is 0.64. This is slightly below what is usually recommended as well as below what has been reported in previous studies. However, there is research to suggest that the measurement reliability of the scale is lower in non-English-speaking societies than in English-speaking societies where almost all previous studies have been carried out (Knight, 1997).

Size. Annual sales are used as the indicator of the size of the firm's resource pool.

Organic growth. The relative growth rate between 1996 and 1998 was calculated from the size figures reported during each of the survey rounds. These growth rates were used to classify the firms into three different growth categories. Firms exhibiting annual growth figures of 30% or above were classified as rapid growers. Those reporting growth figures between 10% and 30% were considered as moderate growers. Size changes smaller than 10% were considered as slow- or non-growth. In order to examine organic growth only, sales increases as the result of mergers and acquisitions were subtracted from, and sales losses from divestments were added to, the sales growth measure.

Acquired growth. In each of the telephone interviews during the two latter years, respondents were asked if the sampled firm had acquired another firm during the past 12 months. If the acquired firm was still operated as an independent firm, its annual sales were asked for. In the cases where the acquired firm had been merged with the acquiring one, respondents were asked to estimate how much the acquisition increased the sales of the acquiring firm.

Additional control variables. Firm age and industry (i.e. manufacturing, service, and retail) were included as control variables.

Sample II

The sample used for the latter two hypotheses was a stratified sample of all Swedish firms. The sampling criteria were based on: (a) the industrial sector using the Swedish equivalent of ISIC codes (manufacturing, professional services, wholesale/retail, and other services), (b) employment size class, and (c) whether the firm was independent or a member of business group. The entire population was 2,455 firms, as obtained from Statistics Sweden (The Swedish Census Bureau). The CEOs of the firms were the target of the data collection.

We began data collection in 1997, where we concentrated on acquiring data for the independent variables. We used different temporal waves in order to overcome the problem of reverse causality; a common problem for cross-sectional data. The different waves included varying types of data collection methods, such as telephone interviews and mail questionnaires. Only firms responding to earlier waves were contacted for the next wave. The final wave included measures of the dependent variables. The final sample contained 889 firms (36% of original sample; 70% of 1997 survey respondents). However, when testing the data in our analyses for this chapter, we found that many firms were lacking complete data covering a number of important variables, including, in some cases, the dependent variable. Therefore, for the purposes of this chapter, this data set consists of 254 firms. *T*-test checks for response bias revealed no significant difference concerning age, size, and ownership for those firms who either did not respond or had incomplete data.

Measures II

Sales and employment variables. Sales turnover and number of employees were obtained for the starting period of the analysis, i.e. 1997 levels. These are official statistics obtained from Statistics Sweden, thus also avoiding common method bias.

Access to resources. These variables measured the perceived access to certain resources that might affect firm growth. These were based on the extant literature resources and growth (i.e. Penrose, 1959; Chandler & Hanks, 1994; Vesper, 1980). We hypothesized that access to financial capital and access to management would have positive relationships with acquisition growth. The access to resource variables were on a 7-point Likert scale.

Growth by acquisition. The dependent variable is whether the firm carried out any acquisitions. The specific questions posed to respondents were whether the firm had completed any domestic or international acquisitions over the past three years. The variable distribution of these two questions was highly skewed. Additionally, we do not make any distinction between international and domestic acquisitions. Therefore, we combined the two variables into one and coded the variable 1 for those having completed at least one acquisition (domestic or international) and 0 otherwise.

ANALYSIS AND RESULTS

Multiple regression analyses were carried out to test the first two hypotheses. The results of the first regression equations predicting organic growth are displayed in [Table 2](#). The first hypothesis states that EO has a positive effect on organic growth. The standardized regression coefficient of EO is positive and statistically significant in the regression equation. Thus, Hypothesis 1 is supported by the data. None of the firm age and the industry control variable, nor firm size is significant in this analysis.

In order to test the second hypothesis, stating that firm size has a positive effect on acquisition growth, a similar regression analysis was performed with acquisition growth as the dependent variable. The results of this analysis can be found in [Table 3](#). Also this hypothesis is supported by the data. Firm size has a positive and statistically significant regression coefficient. None of the other variables is statistically significant.

Table 2. Linear Regression Results for the Effect of EO on Organic Growth.

Variables	Organic Growth
Entrepreneurial orientation	0.19**
Firm size	-0.01
Firm age	-0.15
Manufacturing	-0.18
Service	-0.05
Adj. R^2	0.05

Note: $n = 217$.

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$.

Table 3. Linear Regression Results for the Effect of Size on Acquisition Growth.

Variables	Acquired Growth
Entrepreneurial orientation	0.02
Firm size	0.25**
Firm age	-0.05
Manufacturing	0.09
Service	-0.18
Adj. R^2	0.04

Note: $n = 200$.

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$.

Table 4. Logistic Regression for the Effects of Size and Other Factors on Acquisitions.

	Model 1	Model 2
Sales 1997	0.000	0.000
Employees 1997	0.008**	0.007**
Access to financial capital		0.225*
Access to managers		0.368**
Model χ^2	12.947**	26.347***
-2 log likelihood	306.58	293.18
Pseudo R^2	0.069	0.138

Note: $n = 254$.

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$.

We carried out logistic regression to test the third and fourth hypotheses. This is the most appropriate method when the dependent variable is binary. The results of this analysis can be found in Table 4. These two hypotheses are supported by the data. Perceived access to capital and management are statistically significant. Firm size, as measured by the number of employees, is also significant, providing further support for Hypothesis 2. Firm size as measured by sales turnover is not statistically significant for this sample.

DISCUSSION

We began this chapter with a very strong and intriguing empirical observation concerning growth firms, viz. the fact that the larger the firm, the higher its proportion of acquired growth and the lower its proportion of organic growth. In order to make sense of this observation, we applied the RBV of the firm. Based on this theory we hypothesized that a firm's degree of entrepreneurial orientation would be associated with organic growth, while firm size in itself would be a determinant of acquired growth. We also hypothesized that access to financial capital and management would be a determinant of growth by acquisition. All of these hypotheses were supported by using two different data sets. The positive results suggest that RBV can be a fruitful way of understanding why firms of different sizes pursue different growth strategies. Organic and acquisition growth are different processes, requiring different explanations in terms of the firms' resource endowments and usages. Entrepreneurial resources, reflected in the firm's entrepreneurial orientation, are important to organic growth, whereas the size of the firm's resource pool, as seen by financial capital and managers, is important to acquisition growth.

Although this chapter began with an empirical observation before theorizing *ex post*, the arguments put forward and the empirical results support Penrose's (1959) view of the growth of the firm. This chapter also takes up the task put forward by Kor and Mahoney (2000) for increased process research based on Penrose's thoughts. It also answers the challenge set forth by Delmar et al. (2003) about further research concerning the heterogeneity of the growth process.

It is of interest to note that the results of the analyses also establish that the original empirical observation of the strong size → acquired growth relationship was not simply an anomaly. The observation was persistent over two separate data sets. We have provided some theoretical explanations as to why there might be a distinction between small and large firms in terms of the share of acquired growth. Nevertheless, we do not attempt to provide further explanation into the size → organic growth relationship. While this was interesting in the original empirical observation, the results in Table 2 do not support a significant relationship between size and organic growth. The directionality of the relationship is in accordance with the hypothesis, however.

Studies of small firms and growth/performance have been carried out by Chen and Hambrick (1995), Lee et al. (2001), and Baum, Locke, and Smith (2001). These studies provide ample, although mixed, evidence of the

particular behavior of small firms and growth. They provide further guidance as to the how the entrepreneurial behavior of small firms differs from that of their larger counterparts.

The results from our study can be understood in terms of the resource stock and resource usage of firm. From a resource stock perspective, the totality of the financial and managerial resource pool for small growing firms is usually limited, restricting the options for different growth alternatives such as acquisition growth. The persistent size effects above and beyond the two specifically mentioned resource weaknesses points to other liabilities of smallness being involved in organic versus acquisition growth. Committing to acquisitions requires managerial time to evaluate and integrate an acquired firm, in addition to the financial outlays in order to purchase the firm. Large expanding firms on the other hand have large financial and managerial resource pools, opening several potential avenues for growth. They are therefore less likely to have a reliance on the very subjective and potentially risky “entrepreneurial judgment” of the manager. This can steer them away engaging merely in organic growth and allow them to simply acquire other productive resources from another source. This supports the finding that firms possessing more resources do not always grow more (Mishin, Pollock, & Porac, 2004). Rather, increased access to resources is related to acquisition growth.

Resource utilization arguments would be the following. Managerial resources are used to identify new productive opportunities in the market and in determining appropriate recombinations of existing resources. Unless the firm possesses and uses these resources, it will not understand the external growth opportunities or what is needed to take advantage of them. In this sense, the “entrepreneurial judgment” of the managers is a prerequisite for growth. Further, the managerial resource will attempt to make use of slack resources for more efficient employment of these. This resource will test via research different configurations and recombinative uses of these resources. Entrepreneurial orientation is an effective measure of resource utilization.

The strong firm size → share of acquired growth relationship may have important implications for business as well as policy-making practice. On the macro-level, it hints at a division of labor across firms of different sizes. The result is consistent with an economy where small firms are the major source of genuinely new activities and jobs, and where larger firms eventually acquire these activities and increase the efficiency of the operations. If so, the larger “growth firms” actually reduce rather than increase the number of jobs, but at the same time they perhaps make the activities viable

in the long term in the face of international competition. Alternatively, the results indicate that when firms are small their growth simultaneously fulfills both firm-level and societal-level goals. Their growth is organic and, arguably, probably also local. Therefore, the economic growth of the firm is likely to mean economic growth of the local society. If one firm's growth crowds out another firm it may at least be assumed that resources are reallocated to more efficient use.

A negative interpretation of larger firms' tendency to grow through acquisition is that there is something structurally sub-optimal about how the economy is organized, making modes of growth that contribute less to society more profitable on the firm level. For example, it cannot be ruled out that larger firms acquire other firms in order to reduce competition, thus reducing the pressure to innovate and to use resources efficiently.

On the micro-level the result implies that a growing firm is likely to gradually switch modes of growth from organic to increasingly relying on acquisitions. This will create new types of management challenges, which require in part other skills than those needed for the management of organic growth. With a positive interpretation, it may be the case that at a certain size, new and in some ways better growth opportunities (by acquisition) open up for the firms; opportunities they were previously barred from because of their limited size and access to capital and managers. Alternatively, the result indicates a generic tendency for firms to lose some of their entrepreneurial orientation as they grow larger, leaving acquisition of activities created elsewhere as the only way to use the accumulated resources for further expansion.

One implication for small firms is that it is not sufficient to only possess entrepreneurial resources. Small firms must also control sufficient managerial resources to accommodate the additional resources implied by growth. This could involve the development of a strong management team (Hambrick & Crozier, 1985) and the building of organizational infrastructure (Flamholtz, 1986).

We have made a clear distinction between organic and acquired growth. This distinction has received support by the data. It should be noted, however, that there could be some similarities between the two processes concerning the importance of managerial resources. All acquisitions are not the same and should be viewed along a continuum. At one extreme, the acquired firm is independently operated, the main difference being that the ownership has changed. At the other extreme, the acquired firm is fully integrated with the acquiring firm. As Penrose (1959) points out, the more integrated the acquired firm becomes, the more similar are internal and

external growth in the sense that managerial resources are needed to integrate the new resources. Yet, acquisitions require capital and management resources more than organic growth, even if the acquired firm is not fully integrated with the acquiring firm.

While several authors within the resource-based paradigm have pointed to how important entrepreneurial resources are to the recombination of resources (Connor, 1991; Galunic & Rodan, 1998; Mosakowski, 1998; Penrose, 1959), little empirical research has been carried out in the area. This chapter could be seen as one attempt to empirically test these propositions within the area of firm growth. However, we agree with Mosakowski (1998) that more research is needed in the area.

The RBV of the firm can provide valuable insights into firm growth. In the present case it sheds light on the fact that small firms mainly grow organically, while acquisition growth predominates among large firms. Future research into firm growth would benefit from acknowledging that both the possession and the acquisition of resources, and combinations thereof, may have different impacts on different growth processes. Much will be lost and nothing gained if this is overlooked.

NOTES

1. We use the term “services” in quotation to describe the ability of firms to integrate and reconfigure resources. Definitions of this ability have been developed and refined by subsequent authors, coining new terms such as “core competencies” (Hamel & Prahalad, 1990) or “dynamic capabilities” (Teece et al., 1997). However, we adhere to Penrose’s original vocabulary.

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THE EARLY GROWTH OF RESEARCH-BASED START-UPS

Ans Heirman and Bart Clarysse

This chapter is a study of research-based start-ups and the factors that contribute to their early growth path. *Research-based start-ups (RBSUs) are new ventures, which have their own research and development (R&D) activities and develop and commercialize new products or services based upon a proprietary technology or skill.* These innovative entrepreneurs and their firms received a lot of attention from policy makers and academics over the last two or three decades. This is not surprising because RBSUs are perceived as important drivers for technological and social progress, job creation and economic growth (Acs & Audretsch, 1990).

At first, people had a romantic perception about RBSUs, which are often operating at the cutting edge of new technologies. The dominant view among researchers and policy makers was one presuming rapid growth. This high-growth expectation was fed by the visible success stories, such as Hewlett-Packard, Xerox, Intel, Microsoft and Apple, which all started as small initiatives and grew rapidly into major corporations (Beaver, 2001). Later, in the early and mid-1990s, several researchers reported about the perceived underperformance of RBSUs¹ in terms of growth. RBSUs appeared to be a very heterogeneous group of firms and most of them seemed to grow slowly or not at all (Roberts, 1991; Storey & Tether, 1998; Rickne & Jacobsson, 1999). Nonetheless, the high-growth firms or the so-called ‘gazelles’ kept attracting most attention, while the majority of the slow or

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not-growing RBSUs remained largely overlooked (Autio & Lumme, 1998). But what goes up must come down, it seems. By the end of the 1990s, the extraordinary valuations on technology stock markets crashed, and the high-growth trajectory of several 'gazelles' appeared not to be sustainable. Today, more than ever, policy makers, researchers and the general public are puzzled about the diversity and complexity of RBSUs.

The objective of this study is to bring insights in the diversity of growth of RBSUs and the factors that can explain this. This question is heavily debated in the field of entrepreneurship (e.g. Kazanijan & Drazin, 1990; Roberts, 1991; Delmar, Davidsson, & Gartner, 2003; Wiklund & Sheperd, 2003). To tackle the question of early growth, we build on previous research, which argues that founding conditions can have a long-lasting effect on firm growth and performance (Boeker, 1989). In particular, we study to what extent starting resources and the initial market approach affect the early growth path of RBSUs. The resource-based theory of the firm argues that firm-specific resources and capabilities, which are both rare and valuable, determine the competitive advantage of a firm. When such resources are simultaneously *not imitable* (i.e. they cannot easily be replicated by competitors), *not substitutable* (i.e. other resources cannot fulfil the same function) and *not transferable* (i.e. they cannot be purchased in resource markets), those resources may produce a competitive advantage that is long lived (i.e. sustainable) (Barney, 1991). One of the main challenges for every entrepreneur is to identify and assemble an initial resource base (Penrose, 1959; Brush, Greene, & Hart, 2001). This resource mobilization task becomes even more challenging when the new venture is devoted to new products and technologies. The entrepreneur must not only come up with a new idea, but must also overcome the scepticism of resource providers, since the uncertainty and risk associated with the new venture are particularly heightened when the underlying product or technology is unproven (Aldrich & Fiol, 1994). In recent years, the RBV gained a lot in popularity and we believe that this theoretical lens is very useful to study the early growth of RBSUs.

The resources that are needed and are available depend on the firm's market approach. Start-ups that target international markets early on have higher expenses and hence need more resources. International new ventures also can tap into a larger international resource base (Oviatt & McDougall, 1994). Next, firms targeting large, broad markets need generally more resources to enter these markets than firms focusing on small niche markets (Heirman & Clarysse, 2004). Moreover, investors prefer to invest in new ventures going after large markets because of the higher potential returns (MacMillan, Siegel, & Narasimha, 1985). Previous research showed that

both resources and market strategy are important determinants of venture performance (Chandler & Hanks, 1994). In this chapter, we study the impact of the firm's initial market approach on growth. The high-growth firms or the so-called gazelles are sometimes referred to as 'born-globals' and/or 'platform' companies. This indicates that high-growth firms are (perceived as) firms that go after global and broad markets early on in their life and that the firm's initial market approach may be related to its early growth potential.

This chapter is organized as follows. We start with a discussion on growth of RBSUs and how to measure it. We concisely review the literature that gives some guidance as to factors, which could contribute to growth and formulate specific hypotheses. Next, we describe our sample, the data and analytical procedure. In the following section, we discuss the results of our analysis. We end with conclusions, limitations and directions for future research.

LITERATURE REVIEW

The high-growth potential has long been the dominant view on RBSUs among researchers and policy makers. Several researchers indicate that RBSUs, once they have reached a certain critical mass, exhibit faster average employment growth rates than non-high-tech starters (Mustar, 1995; Licht & Nerlinger, 1998; Storey & Tether, 1998; Delapierre, Madeuf, & Savoy, 1998; Autio & Parhankangas, 1998). However, in recent years several researchers showed that the idea of fast growth does not hold for most RBSUs. Rickne and Jacobsson (1999) found that the vast majority of new technology-based firms (NTBFs) remained very small. Also Autio and Yli-Renko (1998) reported that most NTBFs in Finland did not grow at all. Similar findings were reported in France (Mustar, 1997), Italy (Chiesa & Piccaluga, 2000) and in Cambridge, UK (Segal Quince Wicksteed, 2000). Delapierre et al. (1998) further argue that high-tech firms that concentrate on R&D and work primarily as research subcontractors for large groups show little employment growth. In contrast, firms that deal with turning technology into new uses tend to grow and create employment as they develop their manufacturing and marketing capabilities. Clearly, there is still much discussion and uncertainty regarding the growth potential of RBSUs.

New Venture Growth

'How and why' start-ups grow to become successful firms is one of the least understood aspects in entrepreneurship research. Growth is argued to be a

complex and multidimensional phenomenon. Not surprisingly, there is no single theory, which can adequately explain small business growth, and chances are small that such a theory will be developed in the future (Gibb & Davies, 1990). On the other hand, several researchers argue that firms do not end up with particular growth patterns at random, but that ‘how firms grow’ is systematically related to characteristics of these firms and their environments (Delmar et al., 2003).

While it is unlikely that a comprehensive model with predictive capability for growth will emerge, we think it is possible to identify key success factors that affect growth of RBSUs. To do so, we build on previous research which argues that the circumstances of an organization’s founding play an important role in imprinting the initial form of the organization and influence its later growth and performance (Boeker, 1989; Stinchcombe, 1965). In this study, we focus on the ‘imprinting’ effects of initial conditions to explain heterogeneity in firm growth. More specifically, the firm’s resources and market strategies are thought to impact performance (Grant, 1991; Mahoney & Pandian, 1992). In this study, we use those two approaches to identify factors which differ at founding and which may affect growth. Fig. 1 gives an overview of our growth model.

First, the resource-based view (RBV) argues that success is dependent on the characteristics of the firm’s resource bundle (Barney, 1991) and that one of the new venture’s challenges is to identify and acquire an initial resource base (Penrose, 1959). RBV-scholars explicitly recognize that a firm’s initial resources are an important antecedent to current capabilities and

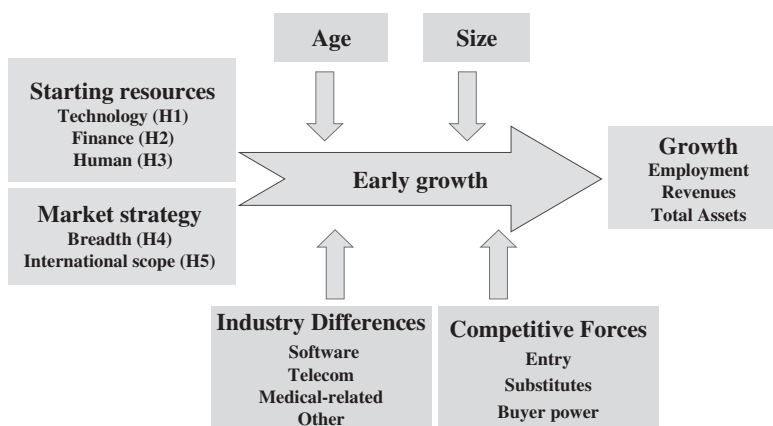


Fig. 1. Explaining Early Growth of RBSUs.

opportunities. ‘Firm resources’ are a multidimensional construct, and entrepreneurship scholars studied different aspects of a firm’s resource base, such as financial resources (Hellmann & Puri, 2000), personal characteristics of the founders or entrepreneurial team (Roberts, 1991, pp. 47–99) and product technology (Utterback, Meyer, Roberts, & Reitberger, 1988). In this study, we complement this literature by studying how different starting resources relate to growth.

Second, the strategic management literature emphasizes the importance of market strategy to explain success. From a resource-based perspective, market strategy involves an ongoing search for rent, or above-normal rates of return (Mahoney & Pandian, 1992). Entrepreneurs must decide about in which markets to search for rents: locally or internationally, in a broadly or narrowly defined market (in terms of number, size and types of customers). Previous research showed that both resources and market strategy are important determinants of venture performance (Chandler & Hanks, 1994). This study adds to this line of research by studying the effect of market strategy on the early growth of RBSUs.

We control for several variables, which fall outside our conceptual model, yet might affect the early growth of RBSUs. These control variables include differences in industry and competitive environment and the firm’s age and size.

In the following paragraphs, we discuss each of the constructs in our model, starting with ‘growth’ and we develop an appropriate operationalization of each construct. Next, we develop specific hypotheses concerning the relationship between resources, market strategy and growth.

Growth of Research-Based Start-Ups: Revenues, Employment and Total Assets

Studies on growth and performance of start-ups have come to contrasting conclusions even on the same explanatory variables (Woo, Cooper, Dunkelberg, Dallenbach, & Dennis, 1989). One possible cause might be the use of different growth and success measures, such as sales growth (Lee, Lee, & Pennings, 2001), employment growth (Westhead & Birley, 1994), profitability (Spanos & Lioukas, 2001), total assets (Achtenhagen, Melin, & Naldi, 2004), first-product shipment (Schoonhoven, Eisenhardt, & Lyman, 1990), self-rated perceptual growth and success measures (Pavia, 1991) or a composite performance indicator (Roberts, 1991). Delmar et al. (2003) argue that there is no ‘one best way’ of measuring growth because firm growth is fundamentally a multidimensional rather than a one-dimensional

phenomenon. They showed that high-growth firms do not grow in the same way and that “*what a ‘high-growth firm’ is, conceptually and operationally, very dependent on the growth measure used*”. Hence, of critical importance in studying the growth of RBSUs is the clear specification of growth criteria in question.

Different measures of growth have been proposed in the entrepreneurship literature, such as (return-on) assets, employment, market share, physical output, profits and sales (Ardishvili, Cardozo, Harmon, & Vadakath, 1998; Delmar, 1997). Several scholars argue that traditional accounting-based indicators of profitability are inappropriate for early-stage RBSUs because most start-ups do not make any profit during their first years (Shane & Stuart, 2002). Sales, on the other hand, is an often preferred measure of firm growth and financial performance of new ventures (Ardishvili et al., 1998) because it is relatively accessible, it applies to (almost) all sorts of firms, and it is relatively insensitive to capital intensity and degree of integration (Delmar et al., 2003). Sales growth is often measured as growth in total revenues (Hanks, Watson, Jansen, & Chandler, 1993). For RBSUs, it is, however, possible that assets and employment will grow before any sales will occur (Delmar et al., 2003). RBV scholars value employment- and assets-based measures as a highly suitable indicator of firm growth (Penrose, 1959). If firms are viewed as bundles of resources, a growth analysis ought to focus on the accumulation of resources, such as employees and other assets. Policy makers are especially interested in identifying firms which contribute most to job creation (Westhead & Birley, 1994). Finally, growth in terms of total assets and resource bases is increasingly receiving attention (Achtenhagen et al., 2004). In particular for RBSUs, growth in total assets might be a relevant growth measure because these firms often need to invest heavily on product and market development before generating revenues. Based on these previous studies, we argue that three measures are most appropriate to study the early growth of RBSUs, namely growth in employees, revenues and total assets.

HYPOTHESES

Product and Technology

Previous research on high-tech start-ups shows that firms which start with product sales significantly outperform those that begin as consultants or R&D contractors (Roberts, 1991; Delapierre et al., 1998). Thus,

Hypothesis 1. RBSUs more advanced in product development at start-up, will grow more in terms of (a) employees, (b) revenues and (c) total assets than RBSUs earlier in the product development cycle at start-up.

Financial Resources

For financing, we study the effect of the amount of starting capital and the involvement of venture capital (VC) investors. Insufficient financial resources are often cited as a primary reason why new ventures fail. Firms with greater financial resources can invest more in product/service development, production and marketing, and have a larger financial cushion to provide insulation against slow start-up, market downturns or managerial mistakes. Previous research suggests that the amount of initial capital invested is positively related to new venture survival and success (Cooper, Gimeno-Gascon, & Woo, 1994). Next, Davila, Foster, and Gupta (2003) give descriptive evidence on how VC is significantly associated with high-growth companies. This positive association between VC and high growth might be due to VCs ability to select firms with high-growth potential or to post-investment benefits that accrue to VC-backed firms (Baum & Silverman, 2004). Next, it is argued that venture capitalists bring more than just money to new ventures. VCs also play an important role in attracting top managers, attracting deals and professionalizing the business (Hellmann & Puri, 2000). Hence, VC involvement might have a positive effect on growth beyond the provision of financial resources. Venture capitalists are an important source of financing for high-risk firms and they tend to invest higher amounts than other early-stage finance providers, such as the entrepreneurs and business angels (Roberts, 1991). Previous research showed that VC involvement is associated with high financial resources at start-up (Heirman & Clarysse, 2004). That is, the firms with the largest amounts of initial financing mostly get their financing from venture capitalists. In contrast, firms starting with the founder's own money, funds from business angels and/or bank loans typically start with lower amounts of initial financing. Therefore, we expect a positive effect of high initial financing, VC-involvement and an interaction effect on early growth. Thus,

Hypothesis 2A. RBSUs with more financial resources will grow more in terms of (a) employees, (b) revenues and (c) total assets compared to RBSU with more modest financial resources.

Hypothesis 2B. RBSUs starting with VC will grow more in terms of (a) employees, (b) revenues and (c) total assets compared to RBSUs starting without VC

Hypothesis 2C. RBSUs starting with high amounts of VC financing will grow more in terms of (a) employees, (b) revenues and (c) total assets compared to RBSUs starting with lower amounts of VC financing.

Human Resources

Firm-specific human capital in new firms is contained within the management know-how and experience of the founder and/or founding team (Welbourne & Andrews, 1996). VCs consistently mention the quality (experience) of the founding team as an important criterion for venture funding (MacMillan et al., 1985), which suggests that human capital is an important predictor for new venture success. In line with this, several researchers report that the entrepreneur's skills and experience are positively related to new firm success (Roberts, 1991). We study the effect of the experience of the entrepreneurial team on early growth. More specifically, we study the cumulated experiences of all members of the founding team in different functions, namely experience in R&D, business development and sales and other functional domains (such as financing, production, etc). Thus,

Hypothesis 3A. RBSUs started by founding teams with more R&D experience will grow more in terms of (a) employees, (b) revenues and (c) total assets compared to RBSUs started by teams with less R&D experience

Hypothesis 3B. RBSUs started by founding teams with more commercial experience will grow more in terms of (a) employees, (b) revenues and (c) total assets compared to RBSUs started by less commercially experienced teams.

Hypothesis 3C. RBSUs started by founding teams with more experience in other functional domains such as finance and production will grow more in terms of (a) employees, (b) revenues and (c) total assets compared to RBSUs started by teams with less experience in other functional domains such as finance and production.

Breadth of Market Strategy

Some start-ups focus on a narrow niche market, while others directly target large markets, which are broadly defined in terms of number, size and types of customers (Cooper, Willard, & Woo, 1986; Romanelli, 1989). Other RBSUs focus initially on a niche market but have the specific intention of differentiating into larger, broadly defined markets later on (Tiler, Metcalfe, & Connell, 1993). Several entrepreneurship and strategy scholars advised new ventures to pursue very narrow niche markets in order to avoid direct competition with large firms. They suggest that new ventures should concentrate on specialized products and market segments where customization and high levels of customer service create unique (to small firms) advantages, or opportunities too small to be of interest to larger, economies-of-scale-oriented firms (Porter, 1980). Other scholars found that new ventures with a broader more aggressive market strategy outperform start-ups with a focused strategy (Biggadike, 1979; MacMillan & Day, 1987). Noting the mixed results of research about the breadth of the new ventures market approach, McCann (1991, p. 193) suggests that it “is a variable that should at least be considered in any research”.

The firms in this study develop and introduce really novel products or services in the market place. Such firms may try to compensate for greater technological uncertainty by a greater market focus (Pavitt, 1998). On the other hand, the popular press also refers to the high-growth companies as ‘platform’ firms, suggesting that these companies pursue a wide array of applications in several markets based on a broad underlying technology platform. In a sample of high-tech start-ups in the Boston area, Roberts (1991, p. 28) found however that companies that focus on core technologies and markets do much better than those that diversify into multiple technologies and markets. Moore (1991) argues that focusing on a specific market segment at first is critical to market and sell new ‘high-tech’ products. Once the potential of the product/technology is demonstrated in an early (smaller) market segment, the firm can use these first customers as a reference to go after larger, broader markets. This suggests that RBSUs with a focus or a niche strategy at first will be more successful than firms pursuing broad markets from the start. Therefore, our fourth hypothesis is

Hypothesis 4. RBSUs targeting narrowly defined niche markets at start-up will show higher growth in terms of (a) employees, (b) revenues and (c) total assets than RBSUs with broad defined markets at start-up.

International Scope of Market Strategy

Start-ups also differ in their international orientation, ranging from a local market focus, over international new ventures, which are committed from inception to sell their products and services in multiple countries to truly global start-ups, which proactively act on opportunities to acquire resources and sell outputs wherever in the world they have the greatest value (Oviatt & McDougall, 1994). Previous research found that RBSUs tend to be more internationally oriented early on in their lifecycle compared to non-high-tech starters (McDougall, 1989). As the new millennium begins, the number of young firms experiencing rapid internationalization appears to be increasing (Shrader, Oviatt, & McDougall, 2000). Autio, Sapienza, and Almeida (2000) argue that a key strategic issue for entrepreneurial firms is whether it is better to start the internationalization process soon after founding, or to postpone international entry until the firms has accumulated significant resources. However, our understanding of the consequences of internationalization for young firms is rudimentary. We analyse the impact of an international orientation from the start on the early growth of RBSUs. Previous research argues that internationalization provides firms with growth opportunities and high-growth firms are sometimes also called 'born-globals' (Autio et al., 2000). Therefore, our fifth hypothesis is

Hypothesis 5. RBSUs with an international market orientation at start-up will show higher growth in terms of (a) employees, (b) revenues and (c) total assets than RBSUs focusing on local markets.

METHOD*Sample*

We study RBSUs in the region of Flanders, which is a small, export-intensive economy located in the northern part of Belgium. The advantage of focusing on one homogeneous region is that it reduces the non-measured variance resulting from environmental conditions.

There is no database of RBSUs in Flanders. The identification of those firms is indeed a challenging and laborious task in most regions. We used four different databases on start-ups in Flanders to compile our sample: (1) a database of all firms founded since 1991 in high-tech and medium high-tech sectors, (2) a database of spin-offs from the different Flemish

universities, (3) a database of all firms that received R&D subsidies from the IWT (Instituut voor de aanmoediging van Innovatie door Wetenschap en Technologie in Vlaanderen, a government agency which encourages innovation and provides R&D grants to firms based in Flanders) and (4) lists of 189 companies in the portfolio of Belgian VC investors. We conducted telephone interviews to a random sample of 500 firms in the first database and to all firms in the other databases to check whether the firms met the definition of RBSUs and to ask the founder's cooperation in this research project. Based on the random sampling procedure, we estimate the total population of RBSUs in Flanders founded between 1991 and 2000 to comprise about 550 firms. We interviewed 213 of these RBSUs. For this chapter on growth, we use the data on the 171 firms founded between 1991 and 2000. The younger firms, founded after 2000, were excluded because their track record is too short to a meaningful growth analysis.

The firms in the sample were between 2 and 14 years old with an average of 5 years at the time of interview. At start-up (during their first year of operation), these firms employed 725 people in total. At the time of survey, these firms employed 4,290 people in total, which means they have grown their employment base since start-up by almost 600%. The mean total employment size is 21 with the majority of the firms employing less than seven people. However, the growth is not uniform across the sample. As expected, the 20 fastest growing RBSUs (about 10% of our sample) account for more than 56% of net additional jobs. Overall, the RBSUs appear to be a group of firms of particular interest to policy makers. In a relatively short time, they have created apparently growing businesses in a wide range of technologies, including software (42%), micro-electronics (12%), medical-related technologies, including biotech (17%) and others (29%).

Data Collection

During the past years, our research team collected detailed data on 213 RBSUs in Flanders, the northern part of Belgium. We reconstructed the life histories of the RBSUs during personal interviews with the founders. To do so, we used milestone events to reconstruct the company history. During each interview, we asked the founder to talk about the start-up and the key events that marked the early life of their companies. Next, we further questioned the founder about the changes in resources, strategy and organizational outcomes (growth and product launches) at these key events. Using concrete events makes it easier to solicit more reliable retrospective information. Each interview was conducted by two researchers: one researcher

asked the questions and the other one took detailed notes. Next, we used a structured questionnaire² to collect quantitative data on the firm's starting resources, important milestones and the early growth path.

We targeted the founders because they typically possess the most comprehensive knowledge on the organization's history, strategy and performance (Carter, Stearns, Reynolds, & Miller, 1994). In entrepreneurship research scholars, have often relied on founders, given the unavailability of archival data. We also collected secondary data (such as company balance sheets, press releases, yearly reports, company brochures, ...) as much as possible to double-check information and enhance the reliability of the data. The combination of in-depth qualitative interview data and detailed archival and survey data makes it possible to bring new insights in the early growth path of RBSUs as well as to test hypotheses statistically.

Measures and Descriptive Statistics

Dependent Variable

A lot of debate has also been devoted to whether absolute or relative growth measures should be used (Achtenhagen et al., 2004). Absolute measures tend to ascribe higher growth to larger firms whereas smaller firms more easily reach impressive growth in percentages (i.e. relative) terms (Delmar et al., 2003). We follow the arguments of Westhead and Birley (1994) and use the absolute growth and not the percentage change. "The obvious concern is that the same change when calibrated from different bases would be represented by different percentages. The effects of employing percentages would be particularly problematic in the sample of small start-ups with three or less employees" (Woo et al., 1989, p. 139). In other words, using relative, i.e. percentage, growth measures is especially troublesome if one studies small ventures since the smallest venture naturally ends up with the highest relative growth even if in absolute terms its growth is negligible compared to the absolute growth of its larger counterparts. To assess the potential causes of employment and revenue growth, we use 'annual absolute employment growth', 'annual absolute revenue growth', and 'annual absolute total asset growth', which are objective measures of the annual absolute employee and revenue change (Hanks et al., 1993; Westhead & Birley, 1994; Delmar et al., 2003).

Independent Variables

Table 1 describes how the independent variables are measured. Table 2 gives an overview of the descriptive statistics.

RESULTS

Table 3 presents the Pearson product–moment correlations for the three dependent variables, namely absolute annual employment growth (AAEG), absolute annual revenue growth (AARG) and absolute annual growth in total assets (AATAG). The correlation coefficients range between 0.51 and 0.68. The Cronbach’s alpha for these three growth measures is 0.83, when

Table 1. Description of Explanatory Variables.

Variable Name	Description
<i>Starting resources</i>	
Start capital	Amount of capital raised in the first year (Euro)
VC	Dummy indication whether capital was raised from VC investors during the first year (1 = yes; 0 = no)
Experience of Founders	Cumulated numbers of years of experience of all members of the founding team in R&D, a commercial function (business development), and other functional domain such as finance, production, etc. (<i>N</i>)
Stage NPD	Stage of development of core product: ranging from (0) no α -prototype, (1) over α -prototype, (2) β -prototype, to (3) a market-ready product at founding
<i>Market strategy</i>	
Market breadth	Breadth of the targeted market at founding ranging from (1) niche or focus strategy, over (2) temporary niche with specific intention to penetrate larger market later on, (3) large and broadly defined market
International orientation	Geographic coverage of market ranging from (1) local focus, over (2) European to (3) global orientation
<i>Control variables</i>	
Industry	Four dummy variables indicating whether the firm is active in (1) medical-related, micro-electronics, software or other sector; (0) otherwise
Entry	Barriers to entry the industry ranging from (1) very low (very easy to enter) to (5) very high (very difficult to enter)
Substitutes	Threat of substitutes ranging from (1) not at all to (5) very high
Buyer power	Power of the customers of the firm ranging from (1) very weak to (5) very strong
Age	Number of years since founding (<i>N</i>)
Initial size	Number of fulltime employees during first year of operation (<i>N</i>)

Note: NPD = New Product Development.

Table 2. Descriptive Statistics for Metric Variables.

Variables	<i>N</i>	Mean	Median	Minimum	Maximum	SD
<i>Dependent variable</i>						
Annual absolute employee growth (AAEG)	170	2.44	0.80	-5.00	21.00	4.40
Log AAEG	136	0.17	0.14	-0.99	1.33	0.55
Annual absolute revenue growth (AARG)	140	333,208	81,054	-400,000	63,36,142	7,61,744
Log AARG	115	5.12	5.20	3.70	6.80	0.68
Annual Absolute Total Assets Growth (AATAG)	155	21,40,70	45860	-33,97,500	64,72,250	8,12,277
Log AATAG	116	1.94	1.89	-0.20	3.81	0.74
<i>Independent variables</i>						
Start capital	169	477,009	62,000	6200	60,00,000	10,81,703
Total experience of founders (years)	170	19.29	15	0	102	17.83
Total R&D experience of founders	170	11.52	8	0	61	13.16
Total commercial experience of founders (years)	170	3.80	0	0	47	7.71
Total other experience of founders	170	3.95	0	0	83	9.15
Stage NPD	170	0.93	0	0	3	1.14
International orientation	169	2.14	2	1	3	0.83
Market breadth	169	1.46	1	1	3	0.69
Entry barriers	158	3.82	4	1	5	1.23

Table 2. (Continued)

Variables	N	Mean	Median	Minimum	Maximum	SD
Substitutes	149	2.80	3	1	5	1.00
Supplier power	79	3.09	3	1	5	1.04
Buyer power	145	3.70	4	1	5	1.06
<i>Control variables</i>						
Employees in first year	168	3.78	2.00	0	30	4.78
Age (years)	171	6.15	5	2	14	2.63

Table 3. Correlation Table between Dependent Variables: Absolute Annual Employment Growth, Absolute Annual Revenue Growth and Absolute Annual Total Assets Growth.

		DV1	DV2	DV3
DV1	Log AAEG	1		
DV2	Log AARG	0.51	1	
DV3	Log AATAG	0.53	0.68	1

Note: All correlations are significant at $p < 0.05$.

missing data are case wise deleted and 0.71 when missing data are substituted by means. Hence, our data indicate that the three growth measures are strongly correlated. Employment, revenues and total assets are different aspects of growth. These three indicators seem, however, closely correlated during the first years in RBSUs.

Multivariate Regression Analysis

In order to assess the combination of factors that best explains growth of RBSUs, we use general least squares (GLS) regression analysis. This statistical technique allows the association of each independent variable with the dependent variable while controlling for the effects of other independent variables. The dependent variables, i.e. our growth measures, are not normally distributed. As a result, statistical tests on the absolute growth measures might be invalid (Hair, Anderson, Tatham, & Black, 1984). We remedy for the non-normality by taking the logarithms of the growth measures. An undesired consequence of using the logarithms of our growth measures is

that the cases in which growth is zero or negative are lost for the GLS analyses. Hence, our sample of observations on the log-dependent variables is biased towards firms with positive growth figures. It is possible that the exclusion of observations introduces a sample bias in our estimation. We therefore also conduct a sample selection model, where we estimate the likelihood of positive growth in employment, revenues and total assets in separate probit equations. We estimate these models by using the Heckman two-step estimation procedure. We tried many different combinations of variables to estimate the probit models in the first step including the same explanatory variables of the main regression as well as others, such as size of founding team, age (founding year), sector etc. None of these combinations resulted in significant lambda and the results of the sample selection models do not differ from the GLS models. We also conducted the GLS analyses with the absolute growth measures. The interpretation of the results is not substantially different but in these models some of the control variables are also significant while they are not in the log-transformed models. The normality assumption is the most fundamental assumption for GLS. Therefore, we prefer to only report the GLS results of log-transformed data.

Table 4 shows the results of three GLS regression models, one for each dependent variable in this study, i.e. log employment growth, log revenue growth and log growth in total assets. Each GLS model includes all the independent variables for which we formulated specific hypotheses regarding their effect on growth and the control variables. The results from the different estimating methods reveal a reassuring consistency. Independent variables explain 28% of the variance in employment growth, 12% of revenue growth and 32% of growth in total assets.

The multivariate analyses show that starting resources have an important impact on the early growth of RBSUs but the effects are not always in the direction we supposed. In Hypothesis 1, we argued that firms that are closer to a market-ready product at founding would grow faster in terms of employees, revenues and total assets. Our data do, however, not support this hypothesis, on the contrary. Our multivariate analysis indicates that firms, which are earlier in the product development cycle, grow significantly more in total assets during the first years than firms that are closer to market launch at founding.

In line with Hypothesis 2, we find that higher amounts of starting capital and attracting VC during the first year are associated with higher employment and revenue growth.³ However, if we include the interaction effect between the amount of start capital and whether or not venture capitalists participated in the initial capitalization, we get a very different picture. The

Table 4. Multiple Regression Models^a.

Variable	Log Employment Growth	Log Revenue Growth	Log Total Asset Growth
Intercept	-0.559 (0.470)	4.169**** (0.710)	1.088 (0.730)
Age	0.002 (0.019)	0.030 (0.029)	0.0468* (0.274)
Initial size (FTE)	-0.014 (0.013)	0.008 (0.019)	0.042** (0.027)
Medical	0.234 (0.153)	-0.099 (0.232)	0.513** (0.246)
Micro electronics	0.199 (0.165)	-0.058 (0.248)	0.106 (0.265)
Software	0.386**** (0.110)	0.081 (0.171)	0.079 (0.157)
Log start capital	0.011 (0.084)	0.091 (0.121)	-0.053 (0.134)
VC	-2.816** (1.517)	-3.583* (2.190)	-0.352 (2.178)
VC*log start capital	0.546** (0.258)	0.608**** (0.372)	0.159 (0.366)
Total commercial expenditure	0.013** (0.005)	0.022**** (0.009)	0.014* (0.008)
Stage NPD	0.027 (0.043)	-0.004 (0.062)	-0.116** (0.058)
Market breadth	0.116 (0.080)	0.013 (0.124)	-0.242** (0.124)
International orientation	0.104 (0.066)	0.208** (0.099)	0.377**** (0.092)
Entry barriers	-0.006 (0.042)	-0.001 (0.062)	0.021 (0.054)
Substitutes	-0.024 (0.040)	-0.014 (0.062)	0.009 (0.056)
Buyer power	-0.009 (0.047)	-0.065 (0.074)	-0.016 (0.069)
R ² adjusted	0.28	0.12	0.32
N	113	92	98
F	3.84	1.83	3.71
Probable Model	<0.0001	0.04	<0.0001

Note: Coefficients are reported. Standard errors are in parentheses.

^aReported models are GLS models. The results remain robust when the same models are estimated with sample selection models (following Heckman’s two-step estimation procedure).

FTE = Full Time Equivalents.

* $p < 0.10$;

** $p < 0.05$;

*** $p < 0.01$;

**** $p < 0.001$.

interaction effect has a significant positive effect on employment and revenue growth. In other words, higher amounts of capital provided by venture capitalists lead to higher growth in employment and revenues. In contrast, the VC dummy in itself is significantly negatively associated with employment and revenue growth. Hence, raising VC at founding has a rather large negative effect on employment and revenue growth unless the invested capital is high.

We hypothesized a positive effect of the founder's experience on early growth of RBSUs in Hypothesis 3. We tested the effect of the cumulated total experience of the founding team members as well as their experience in different functional domains such as R&D, commercial functions and business development and other domains such as financing, legal, production etc. We find that the total number of years of experience of the founding team has a significant positive effect on growth in employees, revenues and total assets. Taking a closer look at the type of experience that best explains growth, we find that only experience in business development and commercial functions (sales/marketing) has a significant positive effect on growth. Experience in R&D and other functional domains (finance, legal, production, etc.) has no significant effect on growth. Therefore, we choose to report only the models including the commercial experience and excluding R&D and other experiences (Table 4). Thus, Hypothesis 3B is supported.

Regarding Hypothesis 4, we find no significant effect of the breadth of the firm's market strategy on employment and revenue growth. We do find a significant negative effect ($p < 0.05$) of market breadth on growth in total assets. This means that firms focusing on narrowly defined niche markets grow more in total assets than firms pursuing broader, less focused strategies. Hence, we find support for Hypothesis 4. Next, we find that an international orientation at start-up has significant positive effect ($p < 0.05$) on revenue growth and a highly significant positive effect ($p < 0.001$) on growth in total assets. We find no significant effect of international orientation on employment growth. Hence, the data support Hypothesis 5. Going after international markets from the start leads to significantly higher growth in revenues and total assets.

Regarding the control variables, we find that software start-ups grow significantly more in number of employees during their early growth path than start-ups in other technologies. Medical-related firms, on the other hand, grow more in total assets. Firms in medical-related industries mostly need higher investment in laboratories and equipment compared to firms in other industries. Hence, it is not surprising that these firms grow more in

total assets during their first years. The significant higher employment growth of software start-ups might be linked to the availability of VC for software companies in the late-1990s. Next, we find no effect of competitive forces (entry barriers, threat of substitutes and buyer power) on the early growth of RBSUs. We used the same measures as the ones used in previous studies on start-ups and Small and Medium Sized Firms (SMEs) (Spanos & Lioukas, 2001). Caloghirou, Protogerou, Spanos, and Papagiannakis (2004) also report that the impact of competitive forces on performance is much weaker than a firm's resources and capabilities. It is, however, also possible that these measures do not adequately capture the competitive forces at founding because these measures are subjective and self-reported by the respondents during the interview. These retrospective measures are, however, the best proxies we have to control for differences in the competitive environment. Finally, we only find a significant positive effect of age and size on growth in total assets, indicating that older and larger firms grow more in total assets.

Robustness Checks

We conduct a series of checks to evaluate the robustness of our findings. First of all, growth might not be a linear function of age. We controlled for that by including age as a control variable in our previous models and found no significant effect. However, our dependent annual growth variables are calculated as the difference between the 'size' (in employees, revenues and total assets) in the first year and the 'size' at the time of interview, divided by the age (in years) of the firm. Hence, these growth measures assume a linear growth process. Therefore, we also checked the robustness of our results in sub-samples of firms with different age profiles. More specifically, we estimated similar models for the sample of firms that are between 3 and 7 years old and between 7 and 13 years old. Our results did not differ substantially, i.e. the directions and significances of the regression coefficients are the same. Further, we were able to obtain annual data for total assets for most companies in our sample. As an additional check, we calculated the yearly growth in total assets for the first three years (all the companies are at least 3 years old, hence we could calculate this measure for the full sample). Again our results remain robust.

We find that early growth in employees, revenues and total assets are significantly correlated with each other. Some independent variables such as commercial experience of the founders explain for the three forms of growth, while other variables such as amount of capital and VC explain for

employment and revenue growth but not for growth in total assets. Across our three growth measures different cases are missing. As a result, these models are not based completely on the same firms. In order to make a more sound judgment on whether different independent variables explain growth in employment, revenues and total assets, we also conducted the same analysis on a reduced dataset excluding all cases where one or more variables are missing. In other words, we only include those 56 firms in the analysis for which all variables are available. The results are again comparable.

DISCUSSION

Contrary to expectations, we found that firms, which are earlier in the product development cycle grow significantly more in total assets than firms that are closer to market launch at start-up. Another interesting finding is that our data indicate that raising VC has a negative effect on employment and revenue growth unless the invested capital is large. We find that commercial experience has a significant positive effect on early growth, while experience in R&D and other functional domains do not significantly affect the growth of RBSUs. This is an intriguing finding since RBSUs have a strong technological component in their business plans and yet we find that the technical experience of the team has no significant effect on growth. Finally, our data support our hypothesis that a focused market strategy leads to faster growth in total assets and that an international orientation at start-ups leads to higher growth in terms of revenues and total assets. In the paragraphs that follow, we compare these main findings with other studies. We also carefully examine the qualitative information (interview reports) of the firms in order to explain our results and to gain deeper insights in the growth of RBSUs.

Large Amounts of VC Lead to High Growth

We find that raising large amounts of VC leads to high growth. The importance of sufficient financial resources for growth is also observed in other studies. For example, Roberts (1991, pp. 264–269) and Lee et al. (2001) found a positive effect of the initial capitalization of technological start-ups on sales growth. However, Roberts (1991) found that this positive effect of initial financing on growth and success is especially strong when the companies generate revenues through product sales. In a mixed sample of

product-based firms and companies, which begun without product revenues, the association of initial financing and firm performance gave mixed results. Nearly, all high-performing firms received high levels of initial financing, but 10 of the 23 firms, which received high levels of initial capital still belonged to the lower performers. Schoonhoven et al. (1990) found that companies with greater monthly expenditures – hence those that raised large amounts of VC – need more time to ship their first product for revenues. They argue that this might signal that firms raising larger amounts of VC focus on more technical ambitious projects. Alternatively, they argue that “just throwing money at a new venture does not appear to be a viable approach to speeding product to markets” and “may inhibit organizational performance”. These firms may show high employment growth figures during their first years because they invest heavily in R&D personnel. However, the sustainability of this growth depends on the firms’ ability to develop products and ship them to customers for revenues before all the cash is burned (Schoonhoven et al., 1990). Baum and Silverman (2004) find that VCs are attracted to firms that have technology that can lead to strong future performance but that are teetering on the edge of short-term failure. The economic function of early-stage VC financing is indeed to provide financial resources for risky but promising start-ups.

If we had only looked at the main effects of amount of financing at start-up and whether or not the firm raised VC, we would have concluded that high amounts of financing and VC have a positive effect on early growth. However, looking at the interaction between both, we get a different view: large amounts of VC have a positive effect on growth, while VC itself has a significant negative effect. This study shows that new venture growth is dependent on the type and the amount of financial resources. Future research should take into account possible interaction effects. This might lead to new insights that may contradict the popular belief that VC is associated with high growth.

In order to explain this intriguing finding, that VC has a negative effect on employment and revenue growth if the raised amounts of capital are small, we took a closer look at the firms in our sample. We indeed found several RBSUs, which started with smaller amounts of VC ranging between 100,000 and 1.1 Mio Euro among the slowest growers. One explanation for the slow growth of the firms can be that they did underestimate the capital needed to finance their activities and lack the resources to grow. Next, these small amounts of capital are often provided by multiple small VC funds without a clear lead investor. One of the entrepreneurs complained about how difficult it was to manage the five VCs on his board of directors and he actually

claimed that the failure of his business was due to the arguing investors who never agreed on important issues. This suggests that a firm, which is not able to raise large amounts of finance from first-tier VC funds might be better off not raising VC at all and use alternative financing channels.

Another possible explanation is that several of these slow-growing VC-backed firms are not ready yet to embark on a high-growth trajectory because their technology or market or both is/are immature. Several of the slowly growing VC-backed firms are university spin-offs, which are funded by specialized VC funds linked to this university. The university funds in Flanders only invest relatively small amounts in start-ups founded with the mission to develop and commercialize new technologies developed within the university. Most of these firms would not be able to raise VC from other private funds because their business idea is too immature. The slow growth of these 'immature' VC-backed firms could therefore be due to the small amounts of VC as well as to the early stage of the product technology.

*Commercial Experience of Founders is a Main Determinant of
Early Growth*

Our results consistently show that founding teams with commercial experience grow significantly more in terms of employment, revenues and total assets. This is an important finding because the firms in our sample all have a strong technological (R&D) component in their business plans and the entrepreneurs mostly have pure technical backgrounds. Roberts (1991, pp. 251–259) also found that prior managerial work experience and prior sales experiences of the founders correlate with success in a sample of high-tech start-ups. He argues that the better performance of commercial-experienced entrepreneurial teams can be due to their familiarity with the market as well as to their awareness of VC sources. He argues that entrepreneurs with commercial experience not only have a better understanding of the market but mostly also have a better understanding of the financial community and how to approach investors. Feeser and Willard (1990) found that high-growth firms are more often started by entrepreneurs with prior experience with the product, market and/or technology than low-growth firms. The importance of founding team experience is also reflected in the VC literature, which consistently mentions business, sector and management experience of founding teams as one of the key criteria for VCs to make investment decisions (MacMillan et al., 1985; Zacharakis & Meyer, 1998).

However, in our population of RBSUs, the founding teams that show considerable commercial experience are rare. On average, the founding

teams have only 3.8 years of commercial experience and the median founding team has no commercial experience at all. On the other hand, almost all companies have at least a few years of technical experience among their founders and on average founding teams have 11 years of R&D experience. It is indeed not surprising that entrepreneurial teams of RBSUs have primarily technical backgrounds and are, presumably, in need of additional members to provide necessary business skills. We observe, however, that technical entrepreneurs seldom seek co-founders with commercial experience because they underestimate the importance of market knowledge or because they believe that they have sufficient market knowledge themselves. Entrepreneurs who have commercial experience but lack technical knowledge are less likely to overestimate their technical capabilities and are more open to add co-founders with the technical know-how.

The founder of the fastest growing firm in our sample formulates the importance of a partner with complementary experience as follows:

The first major milestone in setting up this company was the attraction of a co-founder and CEO. I spotted the market opportunity (*software for financial service industry*) while I was working for a major bank but I knew that I was not the right person to lead a company as this one. I needed a partner with knowledge about the technology, experience in the sector and in managing technology-based ventures. After doing some desktop research, I came up with a list of 4 possible men that might be suited to become partner and CEO. Two of them were senior managers at Oracle and Microsoft, the third one was the CEO of a firm in the payment industry and the fourth one was a successful entrepreneur in the online banking industry and at that time chairman of the market leader in the sector. This fourth man was the right match. After talking back and forth for a while about the business idea and how each of us envisioned the company, he got convinced about the potential and became co-founder, CEO and investor.

The important point is that he did not hire a CEO but attracted an equal partner who obtained an important part of the shares. When we asked about how he felt about sharing his invention with somebody else and giving up part of the control, he replied: "I could never have reached the point where we are today on my own. I rather have a small percentage of something big than 100% of something tiny".

These quotes very well illustrate [Roure and Keeley's \(1999\)](#) argument that two of the most important factors affecting growth are the willingness to accept growth and to manage the consequences of growth including the willingness to add new owners. [Aggarwal, Echambadi, Franco, and Sarkar \(2004\)](#) also support the notion that direct links to industry knowledge through founders better facilitates the integration of this knowledge than grafting knowledge through hiring employees with industry experience. Despite the importance of complementing technical founding teams with

founders with commercial/business experience, our data show that the majority of the RBSUs typically consist of only technical people. Other studies also report that adding people with different complementary experience to technical founding teams is not straightforward. In a case study of one of the RBSUs in our sample, Clarysse and Moray (2004) describe how entrepreneurs with technical backgrounds prefer partners who themselves have technical backgrounds. Similarly, Chandler and Lyon (2001) found that functional diversity was not a major criterion for considering additions to the new venture team in a study of 12 start-up teams in Utah, US. In that study, the most common criterion stated by the founders with respect to team member selection was having a common interest in the technology or service provided by the business. Schefczyk (2001) reports that German entrepreneurs' focus on technology and engineering issues is accompanied by a lack of business skills. Wupperfeld and Kulicke (1993) found that for 80% of failing companies sponsored by public pilot programs, characteristics of the founder-manager contributed to the failure. The shortcomings were most frequently identified in business functions or skills, such as marketing and sales and general management know-how.

International Orientation is an Important Driver for Growth

Our data show that targeting international markets from the start leads to higher growth in revenues and total assets but not in employees. Internationalization is costly and thus it is not surprising that firms with an international orientation grow more in total assets than RBSUs focusing on local markets first. The larger international markets are translated in higher revenue growth but not in employment growth. We asked for the total number of employees of the firm and not only for the people employed in Belgium. The reason for not observing an effect of international orientation on employment growth can, therefore, not be explained by not counting the employees in foreign subsidiaries. A possible explanation is that most start-ups – due to their usual relative poverty of resources – often use distributors and interorganizational alliances to sell their outputs across national borders (Coviello & Munro, 1997).

During our interviews, many entrepreneurs explained that early internationalization was a requirement for their firms to participate in high-technology industries because competition itself is international. Other entrepreneurs argued that the small home market for their technology products and services was the main reason to have international ambitions from the start. Shrader et al. (2000) argue that innovative new ventures with

high-growth ambitions derive more of their revenues from foreign markets and are thus more likely to internationalize early in their existence, prior to thoroughly establishing themselves domestically. Our results are also in line with [Autio et al. \(2000\)](#), who found that the earlier the development of high-tech firms internationalized, the more rapidly they grew internationally. They believe that the survival and prosperity of born-global firms may be explained by their ability to adapt to and innovate more rapidly in new and dynamic environments than would ordinarily be the case for older firms.

Early Stage Technology Companies Grow Faster in Total Assets

Our data do not support our hypothesis that firms which are further in the product development cycle at founding have higher growth than firms that are in earlier phase. On the contrary, we find that the stage of new product development has a significant negative effect on growth in total assets. This means that firms with a product in an early phase of development grow faster than firms that are closer to product launch. This is an intriguing and difficult to explain finding. One possible explanation might be that firms which are in an earlier phase of product development invest heavily in R&D. In Belgium, R&D costs are activated in the balance sheets, which might explain their growth in total assets. Product and technology are important assets for RBSUs and further research is needed to get more insights in how the stage of development affects growth.

CONCLUSIONS AND PRACTICAL IMPLICATIONS

This study brings insights in the characteristics of the high-growth RBSUs by analysing which starting conditions spur growth in the first years after inception. Studies of initial conditions have had the aim of describing and characterizing promising start-ups by studying traits that are visible at start-up ([Gartner, Starr, & Bhat, 1998](#)). This stream of research is highly motivated by, for example, venture capitalists with an interest in generic selection of investment criteria ([Kaulio, 2003](#)) and policy makers favoring a policy of ‘picking winners’ ([Storey, Keasey, Watson, & Wynarczyk, 1987](#)).

Our results indicate that a bundle of assets, and in particular large amounts of VC, a founding team with commercial experience, together with an international market approach lies at the heart of the firm’s growth prospects. Starting with an almost market-ready product, on the other hand, does not affect growth in employees and revenues.

Firms that raised small amounts of VC (mostly from small VC funds) grow less than firms starting without VC. We hope that future research studies the interaction effect between amount and type of financing in more detail. From our study, entrepreneurs should be aware that VC is not the only way to finance RBSUs and it might not be the best option for any business. Alternative financing methods are bootstrapping or launching ventures with modest personal funds, government grants to finance R&D, loans, fuel early growth with revenues from sales and/or services, or up-front- and milestone-payments from strategic partners or any combination of those. Our results indicate that when it is not possible to get sufficiently large VC backing, it might be better to use alternative financing channels instead of raising small amounts of VC. The true entrepreneurial challenge often is not to raise VC but to start the business without it. Once the market potential is clear, the entrepreneurs can try to raise later stage VC to accelerate the growth.

We find that especially commercial experience has a strong impact on the early growth of RBSUs, while the majority of RBSUs is started by purely technical founding teams. Technical entrepreneurs, technology transfer offices and policy makers still often undervalue the importance of commercial/business development experience. Technical entrepreneurs often think that the 'technology' is the most important aspect of their company and lack a clear market orientation. This study also clearly shows that for RBSUs commercial experience is more important for growth than R&D experience. Prospective entrepreneurs should assess their own readiness for starting a new business. If they have the ambition to grow the company, they should be willing to search for business partners to complement their own experience or alternatively acquire the necessary skills themselves and postpone starting their own venture.

Also the government can play an important role in this respect. Several government initiatives exist to support firms in their 'technical' activities (R&D subsidies), but business support programs on the other hand are scarce. Sponsoring training programmes, organizing networking events and subsidies for market research are some of the initiatives that could really make a difference. Finally, technology transfer offices and university start capital funds also seem to emphasize the 'quality' of the technology more than the quality of the entrepreneurial team when selecting and investing opportunities to commercialize public research results. Technology transfer offices and university start capital funds can also play an important role in bringing business people and experienced entrepreneurs in contact with inventors and people with deep technical expertise.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

As any study, this research design and data have limitations. Hence, there are some important caveats to the conclusions of this research and their implications for future research.

Our study only contains data on Flemish RBSUs. A positive consequence of this small geographic coverage is that it reduces the influence of non-measured variance. The trade-off, however, is that one might question the external validity of this region and our findings. Future studies in other regions would provide a useful check of the generalizability of the results. Several researchers argue that the overall availability of resources from the environment influences the resource bases that founders can acquire and develop (Roberts, 1991; Saxenian, 1994). Hence, the external validity of this study is limited to regions, which are comparable to Flanders with regard to the general access to resources. Europe is a very heterogeneous area in terms of technological activity and availability of resources for technological innovation and start-ups. Since 1991, the European Commission has published studies (e.g. *Second European Report on Science and Technology Indicators* (1997), ...), which show that over 75% of the technological activities are taking place in less than 10% of the European regions. RBSUs are typically concentrated in those regions where we find a dense concentration of research institutes and universities (Clarysse, Degroof, & Heirman, 2001). Flanders is one of those regions. We think that within Europe the results may apply to a large extent to the 10% most technology-intensive regions, which comprise regions such as Île de France (France), the Netherlands, Baden-Württemberg, Hessen, Bayern, Rheinland-Pfalz, Nordrhein-Westfalen and Hamburg (Germany), Emilia-Romana (Italy), Stockholm (Sweden), ... (Clarysse et al., 2001). The generalizability of the results to less-developed regions such as Greece, Hungary, Portugal, etc. is more problematic. Next, highly developed high-tech regions such as Boston and Silicon Valley in the US and Cambridge, UK are well known for their vibrant entrepreneurial and VC community and these high-tech regions are different from the Flemish context. RBSUs in these regions have access to more abundant resources and might start on a different scale and might have easier access to other resources later on, which may facilitate their growth path. We do think that the results of this study may also hold for certain areas outside Europe. Steffensen, Rogers, & Speakman (1999), for example, describe the Albuquerque area in northern New Mexico (US) as a region with (1) an abundance of available technologies; (2) a scarcity of

large corporation that are headquartered in the region; (3) an isolation from mass markets and suppliers; (4) a dependency on culture; and (5) low levels of entrepreneurs and VC. This description seems to fit the profile of the Flemish region and therefore the results of this thesis may be valid for this and other comparable regions in the US. Finally, Flanders (or Belgium) is a small open economy. The home market for most (technological) products is very small. As a result, RBSUs in Flanders may be forced to internationalize earlier than RBSUs founded in countries with a large home market such as the US. Hence, the significant effect of an international orientation from the start on early growth should be taken with care and might not hold for regions with a large home markets.

Second, the data used in this study have some weaknesses. The data on the starting resources were collected retrospectively and might suffer from recollection bias, especially for the older firms in this sample. This type of bias might be overcome when start-ups are interviewed at founding and followed-up over time. Our research team aims to follow-up on all the firms that are currently in the sample and to gather longitudinal data of the firms, which are founded each year. Hence, we will be able to diminish this bias in the future. Next, this study focuses on the impact of starting conditions on the early growth path of RBSUs. Of course, starting resources as well as a firm's strategy are not static. This calls for more dynamic designs, following up not only the growth variables but also the development of explanatory variables (Davidson & Wiklund, 2001).

Third, it should be noted that this study analyses the growth of surviving RBSUs at a particular moment in time, rather than on growth of all firms founded between 1991 and 2000. Given that the primary research objectives revolved around the effect of initial conditions on growth, the study of growth of surviving firms was thought appropriate. This study can, however, not specify whether certain initial conditions may have led to failure of RBSUs along their early growth path. Hence, future research should dig a little bit deeper with respect to what distinguishes early growth from *sustainable* early growth. This implies linking the growth literature to the literature on survival, failure and sustainable competitive advantage. Our research indicates that a promising path to follow is to study the business models of RBSUs in more detail. Do the firms have recurrent revenue streams or large one-time contracts? Is the growth in employees disconnected from their revenue growth? Does every new employee make the cash flow more negative or positive? Do they grow more in R&D employees or in sales people?

Finally, we think a very interesting area for future research concerns entrepreneurial team formation. Our data clearly show that adding experienced

business people to technical entrepreneurial teams facilitates early growth of RBSUs. However, functional heterogeneity brings with it various challenges, increasing both cognitive conflict and affective conflict within the decision-making team (Forbes, Borchert, Zellmer-Bruhn, & Sapienza, 2004). Until today, we lack insights in how technical entrepreneurs can deal with these cognitive challenges and what can be done to connect entrepreneurs with business people.

NOTES

1. Many different concepts and definitions are used to describe these firms such as ‘new technology-based firms’, ‘high-tech start-ups’, ‘new innovative companies’ etc. In this chapter, we use ‘research-based start-up’ or RBSUs to overcome the conceptual confusion that exists around ‘NTBFs’ and related concepts (Storey & Tether, 1998; Rickne & Jacobsson, 1999; Rickne, 2000). We believe that ‘research-based start-up’ better captures what most researchers actually mean, namely new companies (start-ups) introducing new innovative products and services on the market, which they (partly) develop themselves (research-based).

2. The questionnaire as well as the manual for the database (i.e. the list of variables and how they are coded) can be obtained from the first author upon request.

3. The models in which log capital and the VC dummy are introduced separately are not shown and can be obtained from the others on request. In these models, the coefficients of log capital and the VC dummy are significantly positive.

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DYNAMICS OF EXTERNAL GROWTH IN SMEs: A PROCESS MODEL OF ACQUISITION CAPABILITIES EMERGENCE

Carlo Salvato, Ugo Lassini and Johan Wiklund

Acquisition growth is not a common theme in entrepreneurship research. Keeping researchers from the topic is obviously not growth itself – a defining concept of entrepreneurship as a scholarly field (Nelson & Winter, 1974; Penrose, 1959; Schumpeter, 1934). However, entrepreneurial growth has traditionally been addressed as organic growth – internal expansion through the extension of existing operations and internally induced process and product innovations. In this paper, however, we contend that acquisition growth may generate entrepreneurial benefits over the long run, which may not be present in organic growth or green-field establishments (Vermeulen & Barkema, 2001; Wiklund & Shepherd, 2005). In fact, acquisition can be a way to release entrepreneurial activities in a firm. Value creation from an acquisition is an activity involving the transfer and recombination of tacit knowledge and the use of co-specialized assets between the firms, i.e., an entrepreneurial endeavor (Nelson & Winter, 1982; Teece, 1998; Vermeulen & Barkema, 2001; Wiklund, Eliasson, & Davidsson, 2002).

Firms which survive the initial formative phases, where exploration, knowledge and competence development are key, tend to start promoting

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exploitation and fine-tuning of existing organizational routines and practices (Levitt & March, 1988; March, 1991; Nelson & Winter, 1982). Exploitation – the ongoing use of a firm’s knowledge base – allows the organization to focus on the knowledge and routines that have contributed most to the initial survival and growth phases (Cyert & March, 1963). However, this gradually reduces variety in the firm’s knowledge base and in the set of capabilities needed for future growth and survival (Ashby, 1956; Kogut & Zander, 1992). These circumstances encourage ossification (Adizes, 1989; Churchill & Lewis, 1983; Greiner, 1972) or, in Miller’s (1993) terms, simplicity – a narrow focus on a single theme, activity or issue at the expense of all others, coupled with narrowing, increasingly homogeneous managerial “lenses” or world views. There is, however, a need to strike a balance between exploration and exploitation (March, 1991). This can potentially be achieved by acquisitions.

Under certain conditions, acquisitions may be a response – though obviously not the only one – to resource maturity, ossification and simplicity. Acquisitions may revitalize a firm and improve its ability to anticipate or to react adequately to changing external conditions. By administering the relatively controlled shocks determined by acquisitions, entrepreneurs may revitalize their organizations and foster their long-term viability. The cultural and managerial ferment induced by acquisitions and post-acquisition integration breakthrough the acquirer’s rigidities and inertial forces, leaving an organization which is better suitable to pursue entrepreneurial activities.

These positive outcomes, we contend, will only ensue to acquiring organizations when acquisition growth is coupled with the development of acquisition capabilities, i.e., with the accumulation, storage and exploitation of fresh organizational knowledge (Haspeslagh & Jemison, 1991; Vermeulen & Barkema, 2001; Zollo & Singh, 2004). When discussing the potential benefits of acquisitions, a distinction is usually made between value *capture* and value *creation* (Haspeslagh & Jemison, 1987, 1991; Singh & Montgomery, 1987). Value capture is a one-time event resulting from features inherent in the transaction itself, e.g., asset stripping and tax benefits. In contrast, value creation is a long-term phenomenon resulting from entrepreneurial action and the interaction between the firms involved. It embodies the transfer and recombination of capabilities between the two firms, which is commonly referred to as synergy (Jemison, 1988).

How the capabilities for generating value creation through acquisitions evolve in the real world is an open question. In particular, it is interesting to understand how “serial” acquirers develop acquisition and integration capabilities over time. It is also interesting to investigate how firms, which do

acquire can report high levels of satisfaction related to the process of external growth, within the typically dismal record of acquisition performance.

To explore these questions, we have engaged in a longitudinal comparative study of 18 growing Italian small- and medium-sized firms (SMEs) from different industries. SMEs represent an ideal context for studying the development of acquisition and integration capabilities because, as opposed to large market leaders, SMEs are far less likely to engage in acquisitions with the major purpose of buying competitors to reduce competition. Instead, potential synergies represent a major reason for acquiring other firms. Over the period of interest, some of these SMEs have accomplished staggering growth rates through acquisitions, to the extent that they have shifted from the small to the medium and sometimes to the large-size category.

In the next sections, we first describe the logic behind our case selection, and the steps of data collection and data analysis. We then illustrate the empirical evidence of processes of acquisition capabilities development within observed firms – a process which encompasses phases of creation or access of acquisition knowledge, phases of knowledge accumulation and phases of knowledge retrieval and recombination. Finally, in the discussion section we present the model that synthesizes the way in which the surveyed companies gradually learned the “job” of acquiring (see Fig. 2). We conclude by summarizing our main results and pointing to some practical and research implications of our results.

METHODS

Our focus on external growth and related competence development as a process required observing and jointly examining a large number of variables that influence growth processes and, in particular, the complex relationships among them (Huber & Van de Ven, 1995). The heterogeneity of the phenomenon requires rich and deep descriptions aimed at assessing the abstractions and generalizations that can be meaningfully attempted (Davidsson, 2005, p. 56).

Hence, we decided to conduct a “qualitative” study, targeting a relatively limited number of companies (18) over time, analyzing them in depth by using many different data sources and developing insights through a comparative logic.

Selection of Cases

The unit of analysis in this study is all business activities controlled by the entrepreneur, the entrepreneurial team or the entrepreneurial family, and

not an individual governance structure (Davidsson & Wiklund, 2000, 2001). We were interested not so much in the growth of any individual firm or establishment, but in the overall growth of the whole group of business activities controlled by such individuals or groups of individuals. However, for ease of presentation we refer to “the firm” or “the organization/al entity” in the remainder of this chapter.

We have selected 18 such cases by sampling on the dependent variable – an acceptable procedure in order to study *how* firms grow by acquisitions (Davidsson, 2005, p. 149). Our aim was to theoretically sample (Eisenhardt, 1989; Miles & Huberman, 1994; Yin, 2003) a number of “cases” characterized by different growth rates over the same time period, different attitudes toward acquisitions (8 out of the 18 sampled firms have not acquired) and different initial size (see Tables 1 and 2 for an overview). We kept industry characteristics relatively constant, by only selecting cases of manufacturing firms in relatively mature and traditional contexts (i.e., food, apparel, mechanical, chemical and pharmaceutical products).

We tracked down the whole acquisition history of each case, which in three cases traced back to the early 1980s. However, the comparative analyses focus on the 1997–2002 period.

Data and Analyses

The strength of case studies is their breadth and richness. For this reason, case studies should necessarily be based on a multitude of sources of evidence (Lee, 1999; Miles & Huberman, 1994). This triangulation and the use of a number of analysis strategies also helps establish the validity of the results (Yin, 2003). We systematically consolidated the gradually emerging conclusions, researching counter examples and alternative interpretations. When conflicting evidence did not alter the results that emerged or when it allowed them to be refined and enriched, the results acquired greater solidity. Furthermore, recourse to common and structured analysis formats helped to systematically and gradually build explanations.

Both primary and secondary data were employed in our research. Primary data prevalently consisted of a series of semi-structured interviews that followed a common format in all the cases examined, as well as a second group of unstructured interviews that went in greater depth (Miles & Huberman, 1994; Wengraf, 2001). Secondary data, instead, had a core that was common to all cases (including, for example, the financial statements for the period of interest), in addition to a collection of documents, publications and archive data geared to understanding the specific characteristics of each of the cases examined.

Fig. 1 illustrates the sequence of data collection and analysis phases that characterized the research study. During Phase 1 of the study (“Preliminary collection and analysis of secondary data”), secondary data were collected from public sources and the company. Financial statements and an ample press review for the period of interest (1997–2002) were put together for each company. Depending on the type of activity carried out and on their availability, we collected books, publications, catalogs and company documents. The main objective of this first stage was to obtain as much information as possible on each company before starting the primary data collection, so that the interviews – and their interpretation – would be more focused. This information was collected in a database which allowed us to reconstruct in detail each company’s history, map its business areas, identify the characteristics of the sectors in which the company operates and track their evolution over time, identify the main competitors and describe the key events that marked the company’s growth history.

Phase 2 (“Semi-structured interviews”) involved six interviews with each company targeted at directors and other managers relevant for the study. The questionnaire was drawn up in such a way as to gain an understanding of each interviewee’s vision on the growth process, its determinants, the obstacles encountered and the actions taken to overcome them, the resources and competencies that supported growth and the planning aspects of growth. Typically, in this phase – but the situation varied slightly among the 18 companies – we spoke to the head of the company (generally the President or the Managing Director), the General Director, the Financial Director, the Marketing Director, the Production Director and the Human Resource Director. The questionnaire contained 20 questions, eight of which were the same for all interviewees, while the others varied according to the director’s function. Practically, all interviews were recorded and transcribed. This phase allowed us to describe in detail and interpret the growth path of each of the 18 companies.

Phase 3 (“Further ad hoc investigation”) allowed us to study the issues of external growth through acquisitions and of post-acquisition integration in greater depth. No predetermined format was followed in this phase. Phase 3 consisted, above all, in the further collection of secondary data: typically documents, with the purpose of further analyzing the issues under review. Executives were asked to provide the documents with which the more recent operations had been presented to investors, the economic, financial and competitive profiles of the acquired companies and a description of the documents that the company had used to evaluate the acquisition targets. Besides collecting further secondary data, additional interviews – often with

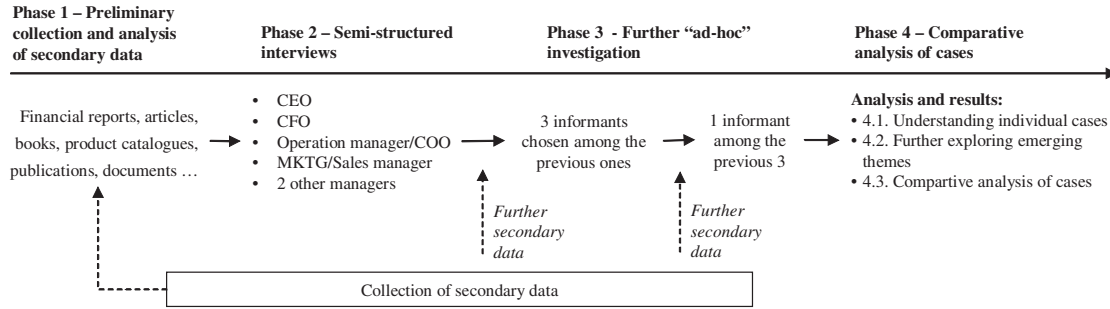


Fig. 1. Phases in Data Collection and Analysis.

the directors already interviewed in Phase 2 – were done to examine more in depth the issues that had emerged as central.

In Phase 4 (“Comparative analysis of cases”) all the information collected in the previous steps were analyzed at different levels. First, a detailed profile for each of the 18 companies and a structured interpretation of their growth process was drafted. The procedure involved the preparation of a structured company fact sheet and report common to all companies, with the purpose of making data homogenously comparable for all the companies included in the sample. This analysis – preliminary to the in-depth analysis performed in the subsequent two phases – generated an understanding of the growth process, of its determinants and of its results for each company. Second, data collected and elaborated in the previous steps were analyzed focusing attention on the issue of acquisition and integration processes and on the subsequent development of acquisition competencies. Third and lastly, a cross-case analysis was conducted yielding an overall interpretation of the external growth processes of all the 18 cases examined, analyzed with shared interpretation criteria.

Table 1 gives an overall view of the four phases of the study, recalling for each of them the data sources employed, the tools used for the collection and analysis of data and the elaborations obtained as the result of each phase. The methodological precautions employed helps ensure reliability and validity to the results obtained.

DATA

Growth and Acquisitions

Table 1 classifies companies in terms of final size and historic growth rates and Table 2 details growth and size figures. Out of the eight companies that showed the highest growth rate (over 100%), three (Techniplast, Tessitura Candiani and Tod’s) did not acquire any company and only one (Tod’s) had plans to do so in the near future. Of the remaining companies which grew more than 100%, one carried out 6 acquisitions, two carried out 7 acquisitions and the other two carried out 9 and 19 acquisitions, respectively. It is worth noting that the five companies that grew more than 100% and carried out acquisitions combined external growth with significant organic growth processes, mainly by developing new products or by entering into new markets. Among the four companies that grew between 50% and 100%, only one (Chiesi) carried out more than one acquisition, while two carried out none. Finally, the six

Table 1. The Research Phases, the Tools Employed and the Results Obtained.

Research Phases	Main Sources of the Data Used	Data Collection and Analysis Tools	Results Obtained
1. Preliminary collection and analysis of secondary data	Financial statements, articles, books, catalogs, publications, company documents	Database of secondary data for each case Analysis of financial statements	For each case: company history; analysis of financial statements; identification of business areas; description of sector and its evolution; identification of competitors, relevant external events
2. Semi-structured interviews	6–7 interviews for each case	Semi-structured questionnaire (approx. 20 questions per interview of which 8 were common to all interviews).	Completion of data collected in Phase 1. Identification of the aspects relevant for the interpretation of the growth path in each of 18 cases
3. In-depth analysis	Collection of further secondary data 2–3 additional interviews, selected on the basis of the results of Phase 2	Unstructured interviews	In-depth analysis of the relevant aspects arising from Phase 2
4.1. Interpretation of individual cases	All the results of the preceding phases	Structured company fact sheets Structured reports for each company	Understanding of the growth process, its determinants and its results for each of the 18 cases examined
4.2. Analysis of the emerging issues	Structured company and report sheets (Phase 4.1)	Centralized database of the collected data	In-depth transversal analysis of the main issues that proved to be relevant for the interpretation of growth processes
4.3. Comparative interpretation of the 18 cases	All the results of the preceding phases	Centralized database of the collected data	Comparative interpretation of the growth processes of the 18 cases examined: proposal of shared interpretation keys

Table 2. Growth, Corporate Size and Acquisitions in the 18 Firms Included in the Sample.

Sales Growth Rate (1997–2002) ^a			
> 100%	Tecniplast (0 – No)	Tessitura Candiani (0 – No) Sabaf (6 – Yes)	Mapei (9 – Yes) Brembo (19 – Yes) Tod's (0 – Yes) Campari (7 – Yes) De Longhi (7 – Yes)
50–100%	La Sportiva (0 – No)	Ferrarini (1 – Yes) Illy (0 – No)	Chiesi (6 – Yes)
< 50%	Fratelli Sassi (0 – Yes)	Sifi (1 – No) Fratelli Carli (0 – No)	E. Zegna (4 – n.a.) Max Mara (n.a.) SCM Group (7 – Yes)
Number of employees (2002) ^a	<250	250–1,000	>1,000

Note: Within parentheses we report, for each organizational entity: (A) the number of control acquisitions carried out in the company's history; and (B) the presence(Yes)/absence(No), as of 2003, of the formal intention to carry out acquisitions in the near future (i.e., within the planning horizon).

^aWhile we were able to trace the entire history of acquisitions in each firm (e.g., the first acquisitions trace back to 1982 in Chiesi and to 1983 in Brembo), we only have full comparable data on growth and managerial intentions for the period 1997–2002.

companies that grew less than 50% carried out one (Sifi), 4 (Zegna) or 7 (SCM) acquisitions, or none at all (Sassi and Carli). In terms of size reached at the end of the period, the companies included in our sample that carried out at least two acquisitions had more than 1,000 employees in 2002.

The tables show that acquisitions are not the only way to reach substantial growth. Some of the companies grew extensively and exclusively through internal growth processes and companies conducting acquisitions did not neglect organic growth. Interestingly, however, the companies that massively invested in acquisitions all attained a larger size at the end of the period. Acquisitions were not a dominant means of growth. Eight firms did not carry out any acquisition at all, half of them expressing no intention of doing so in the near future. However, of the 10 companies that had at least one acquisition experience only one declared it had no other acquisitions in mind. For these, latter companies acquisitions have gradually become a

recurrent, albeit not exclusive, managerial practice in pursuing corporate development (Table 3). It would seem that acquisitions create a sort of “divider” between small firms that have never done an acquisition and have no intention of doing so in the short-medium term, and those that have and also evaluate further opportunities. Based on the interviews done, it would seem that this difference is of a psychological and corporate culture-related nature.

Some sudden and considerable increase in size were achieved, thanks to acquisitions (Table 3). The first two acquisitions of one of the surveyed companies led to increase in turnover of 26% and 24.6%, respectively and of 51% and 48% in the number of employees. The single acquisition of another company generated an increase of 73.8% in turnover and of 85.9% in the number of employees. Few of the acquisitions generated less than a 10% increase in turnover for the acquirer.

Motivations Underlying the Decision to Pursue Acquisition Growth

By the firms not engaged in acquisitions, several reasons for refraining from acquisitions were given. One rapidly growing company reported that all of its energies and resources were concentrated on organic growth, leaving little room for the evaluation of external growth opportunities. Other companies decided to forego acquisitions because of a focus on developing a single business niche. In other cases, there were few suitable acquisition targets. Very focused companies or those with a very strong and well-known brand felt the need not to alter the perception and the reputation of the trademark.

The interviews also indicated motivations that stemmed more from the orientation of the entrepreneur and management, than from the structural characteristics of the company or the sector. One of the entrepreneurs mentioned that the decision not to acquire also reflected strong doubts on the company’s ability to integrate an entity presumably with a culture very different from theirs. The fear of not being able to bring the integration phase to completion and manage the acquired companies was also clear in the words of a close collaborator of the entrepreneur of one of the other surveyed companies without acquisition experience.

What held the owners back a bit was the idea: ‘if we don’t have anybody who can manage it, why should we expand, why acquire?’ Even though the owners had always been known to press on, never stopping, improving not only sales but also the results of the company.

Table 3. Relevance of Acquisitions in the Investigated Firms.

Firm/Group ^a (in Decreasing Order of Sales Growth 1997–2002)	Δ Sales 2002–1997 (%)	N. Acquisitions	Period	Acquisition Intentions in 2003	Sales 2002 (Million €)	Employees 2002 (Size) ^b	Size in 1997 ^b
Tecniplast	269	—	—	No	48	196 (small)	Small
Tessitura Di R. Candiani	141	—	—	No	154	440 (medium)	Small
Tod's	136	—	—	Yes	358	1,715 (large)	Medium
Mapei	135	9	1994–2001	Yes	733	3,227 (large)	Medium
Brembo	133	19	1983–2001	Yes	566	3,575 (large)	Small
Sabaf	129	6	1983–2001	Yes	103	493 (medium)	Medium
Campari	110	7	1995–2002	Yes	783	1,346 (large)	Large
De Longhi	109	7	1986–2001	Yes	1,251	5,646 (large)	Small
Chiesi	97	6	1982–2002	Yes	414	2,430 (large)	Small
Ferrarini	86	1	2000	Yes	234	757 (large)	Medium
La Sportiva	62	—	—	No	12	100 (small)	Small
Illy	61	—	—	No	193	527 (large)	Medium
Ermenegildo Zegna	46	4	1994–2002	Yes	661	3,970 (large)	Large
Max Mara	41	—	—	n.a.	1,111	3,791 (large)	Large
Fratelli Sassi	37	—	—	Yes	136	220 (small)	Small
SCM Group	33	7	1986–2002	Yes	446	2,933 (large)	Large
Sifi	33	1	—	Yes	44	325 (medium)	Small
Fratelli Carli	–5	—	—	Yes	106	252 (medium)	Small

Note: Only control acquisitions are included in the table. Hence, we have not included acquisitions of minority shares, acquisitions of brands, distribution agreements, partnerships and acquisitions of companies distributing the acquirer's products.

^aThe unit of analysis in this study is the entrepreneur, the entrepreneurial team or the entrepreneurial family. Hence, growth relates to all business activities controlled by these individuals or groups of individuals (Davidsson & Wiklund, 2000, 2001).

^bBased on the number of employees (small <250; medium <500; large >500).

The need for having to borrow excessively, excessive pricing of target companies or, as stated by one respondent, the fear of “biting off more than he could chew” were additional reasons for refraining from acquisitions.

Acquiring companies, on the other hand, had greater confidence in their ability to overcome resources constraints. This was summed up by one company: “As far as I can remember, there has never been a situation in which a really interesting target was excluded for financial reasons.” Another one stated: “Our company has always been perceived for the potential it actually had; even in more difficult times, such as in ’95 and ’96 when there were the first acquisitions and debt increased, we never feared having real problems in finding financial resources.”

To a large extent, companies that carried out acquisitions were initially driven by competitive and other contextual conditions (Table 4) (Low & MacMillan, 1988; Ucbasaran, Westhead, & Wright, 2001). The specific competition arenas in which companies such as Campari, Brembo, De Longhi and Ferrarini are active, went through periods of intense horizontal and vertical concentration in the 1990s. Alongside such concentration processes, acquisition opportunities presented themselves, i.e., interesting acquisition targets in countries in which the company had decided to expand geographically.

In the sections below we describe how, once the acquisition path has been taken, the learning processes and the consequent accumulation of competencies significantly reduce the psychological load linked to such operations, making the related strategic decisions increasingly less difficult and improving the perception of subsequent results.

Phase I: Learning from Experience: The Creation of Acquisition Knowledge

All the acquiring companies clearly learned from their acquisition experiences. As one of them said:

The acquisitions were certainly positive. They brought growth and were an opportunity for cultural development, both from the manufacturing and the commercial standpoint, because we also learned from the companies we acquired.

Mistakes and crisis situations – greatly feared by the entrepreneurs who did *not* carry out acquisitions – were the issues on which acquiring firms built their learning paths. Outcomes not meeting targets or mistakes and crises during the acquisition process provided learning opportunities. Campari,

Table 4. An Overview of Acquisition Characteristics in Investigated Firms.

Firm/Group ^a	Acquisition ^b	Year	Relevance (Size)	Motivation	Related Business	Strategic Coherence	Integration	Industry Context
Brembo	Marchesini	2000	Low	Product range	Yes	Yes	Full	Vertical acquisitions
Campari	Cinzano	1999	High	Market share/ product range	Yes	Yes	Partial	Intense horizontal concentration
	Ouzo 12	1999	Medium	Market access	Yes	Yes	Partial	started in the early 1990s
	Skyy Spirits	2002	High	Market access/ products	Yes	Yes	Minimal	
	Zedda Piras	2002	Low	Products/industry	Yes	No	Partial	
	Riccadonna	2003	Low	Products/industry	Yes	No	Full	
Chiesi	Barbero 1891	2003	Medium–high	Market share/ product range	Yes	Yes	Initial stage	
	Logeais	1998	High	Geographical market	Yes	Yes	Full	Presence of strategic opportunities (target firms in geographical markets)
	Trinity	1999	Medium–low	Geographical market/product	Yes	Yes	Partial	
	Torrex Pharma	2001	Low	Geographical market/product	Yes	Yes	Minimal	
De Longhi	Asche	2002	Low	Geographical market/product	Yes	Yes	Initial stage	
	Kenwood	2001	High	Product range/new market/ production capacity	Yes	Yes	Partial	Intense concentration started in the 1990s
	DL Radiators	2000	Medium–low	Brand/product range	Yes	Yes	n.a.	
	Climaveneta	2000	Low	Product/market	Yes	Yes	n.a.	
	Micromax	2000	Low	Brand/product range	Yes	Yes	n.a.	

Table 4. (Continued)

Firm/Group ^a	Acquisition ^b	Year	Relevance (Size)	Motivation	Related Business	Strategic Coherence	Integration	Industry Context
Ferrarini	Ergoklima	2000	Low	Product/market	Yes	Yes	n.a.	
	Sile	2000	Low	Product range	Yes	Yes	n.a.	
	Vismara	2000	High	Complementary product/new markets	Yes	Yes	Full	Increasing concentration
Mapei	Rescon Mapei	1999	Medium	Product/niche	Yes	n.a.	Partial	Limited concentration
	Detman SA	1999	n.a.	Market	Yes	Yes	n.a.	n.a.
	Adesital	2000	Low	Production capacity	Yes	Yes	Full	High concentration
	Gorka Cement	2000	Low	Vertical integration	Yes	Yes	Full	High concentration
	VaGa	2000	Low	Vertical integration	Yes	Yes	Full	High concentration
Sabaf	Chembond	2001	n.a.	n.a.	Yes	Yes	n.a.	n.a.
	Sopro Group	2002	High	New market	Yes	n.a.	Partial	Limited concentration
SCM	Faringosi Hinges	2000	Medium–low	Industry	Yes	No	Minimal	Segment maturity
Sifi	CMS	2002	Low	Industry	Yes	No	Partial	Segment maturity
Zegna	Oftafarma	1999	Low	New market	Yes	Yes	Partial	n.a.
	Agnona	1999	Low	Product range	Yes	Yes	n.a.	Expansion
	Master Loom	2000	Low	Technological know-how	Yes	No	n.a.	Expansion

^aThe unit of analysis in this study is the entrepreneur, the entrepreneurial team or the entrepreneurial family. Hence, growth relates to all business activities controlled by these individuals or groups of individuals (Davidsson & Wiklund, 2000, 2001).

^bSome names of acquired firms have been abridged for presentational purposes.

for example, used the first acquisition as a practice field for the development of competencies in production, job safety and industrial relations – skills that the company lacked since until then it had operated in one single plant, practically producing only one product:

for example, at the factory [of the acquired company] we inherited situations that were disastrous to say the least. The factory was conceived according to concepts that were decisively old, obsolete – you name it – and very confusing; it lacked compliance with regulations [...]. The layout of the plants needed fixing and so we had to carry out works on the factory that lasted two years [...], during which we intervened on four lines [...] optimizing them and making them much more functional. We conducted very intensive labor union negotiations, because the revamping obviously determined a massive cut in staff numbers. This is how we learned to do all these things. We had rarely done them before, but we rolled up our sleeves and learned.

However, what emerged with equal clarity is that the learning processes occurred also thanks to the particular conditions during which the acquisitions were carried out. In the investigated cases, the majority of acquisitions – successful and unsuccessful – took place in a context that allowed the consequences of possible errors to be contained, and a “practice field” for the development of competencies for possible use in subsequent operations to be built.

First, acquisitions were always carried out with a certain caution and without venturing far beyond the range of the competencies the company already possessed. A constant characteristic of the acquisitions carried out by the surveyed companies was that the management perceived a high degree of consistency between the activities of themselves and the target firm. Respondents were asked to assign a value for the degree of strategic coherence comprised between 1 (“no coherence”) and 7 (“perfect coherence”) for each of their acquisitions. All acquisitions were given a 7 with the exceptions of two cases (values 5 and 6). Therefore, acquisitions did not represent unrelated diversification, but were adjacent to those of their main business activities. For example, the Zegna family acquired Lanerie Agnola S.p.A., the owner of one of the most exclusive luxury clothing brands in 1999, while in 2003, the Campari group acquired Barbero 1881, owner, among others, of the Aperol trademark.

Often, consistency was not limited to the market or industrial competition aspects, but extended to cultural and organizational characteristics. Respondents declared that acquisition was successful, to a large extent, because there was consistency between the values of the entrepreneurial family and those of the family that was selling the property. Zegna acquired Guida

S.r.l., the owner of Longhi in 2002, one of the most prestigious trademarks in leather and leather clothing. Zegna's management stated:

We have entertained intense and significant commercial relations with the Pennacchi company and family for years and we appreciate their professional and personal talents. The rigorous selection of leathers, the meticulous control of the entire processing cycle and the attention to detail in tailoring, thanks to which the needs of the most demanding clients can be met. We feel these characteristics are very close to our way of doing business.

There was only one case of a deal in a sector that, albeit related, featured different critical success factors, when Campari, active in the spirits industry, acquired Zedda Piras, whose main asset was the wine company Sella & Mosca. This acquisition was determined by the financial market's requirements for a company close to stock listing.

The acquisitions observed highlighted two other aspects that might have enhanced learning processes. The first was the existing management's perception of its ability to manage the acquired unit: "Our acquisitions were always decided with an eye to our size and to our actual possibility of managing them with the management the company had at that time" The second aspect was instead the presence of very clear and tangible synergies or elements of complementarity of the industrial, commercial or marketing type. Referring to the main acquisition it carried out, the entrepreneur of a food company, for example, declared:

We feel we took home a mass of quite relevant proportions, exceptional in terms of productivity, because the acquired company is not only a brand, but a factory: we were able to rationalize the different plants and take home a great brand at the same time.

Similarly, the managers of a chemical-pharmaceutical company repeatedly underlined how the acquisitions were always motivated by the intention to acquire at least one of the following elements: factories with unutilized production capacity; particular technologies; strategic raw materials; strategic geographic positioning; market share; and experienced management.

The lessons learned regarded not only the characteristics a target must have, but also the way in which acquisitions should be carried out. Here too, there were only a few, very simple elements, but they were expressed clearly and coherently by the head of a company and the members of his management team.

First: apart from very rare cases, in which the seller has a particular need, [...] we don't use investments banks [...] The second very important element – and I believe that was our trump card in acquisitions – was our great flexibility in understanding the seller's agenda [...] As long as it is not negative for us, we do anything we can to facilitate the seller.

The second factor mentioned by this entrepreneur, i.e., the great attention paid to understanding and favoring the needs of the seller – was common in practically all the acquisition stories we heard. In practically all cases, both the acquiring company and the target were family businesses. Understanding the mechanisms that drives a family to sell a company branch or the entire business, as well as the mechanisms that influence behavior in the negotiation phase, were perceived by the acquiring companies as a central issue in determining the success. Companies carrying out more than one deal tried to build future success on such experience:

We don't believe that who pays 1 Euro more is the winner in acquisitions. There is obviously a minimum amount beneath which you lose. But, once the expectation level of the seller has been met, what really counts is the soft side, except in the case of true auctions where the last dollar wins. The contract, the way of approaching the deal, the way it is structured ... When we were doing our third acquisition, some competitors offered more, but they would have dismantled the organization this 70-year old man had created and wanted to preserve. I realize this may sound strange, but for this 70-year old man without heirs, 400 or 500 million dollars would have been the same because it's only a number written in a bank account. In the end, we won by offering 400 million dollars, coupled with the option of keeping his creation alive and remaining involved in the organization – in fact we kept him on board for three years with puts and calls ... We always try to build something we feel might be more appealing to the seller.

Finally, further lessons learned concerned means of integration. All the surveyed companies that had carried out more than one acquisition systematically reported that a “flexible” approach in terms of degree, areas and tools of integration was preferred over a standardized one. The head of business development of one of the surveyed companies summed this up:

We don't have a recipe for integration, based on which you do 'A, B, C, D' every time you buy a business. We adopt a layman's approach and we see what needs to be done on a case-by-case basis. The factors that play a role are evidently many.

Companies that had carried out several acquisitions developed advanced acquisition strategies that led them to diversify the degree and means of integration with the target company, instead of following the same *modus operandi* every time. Although in some cases acquisitions were managed according to a similar logic, the integration phase was managed in many different ways. On a scale from 1 (“no integration”) to 7 (“complete integration”), respondents typically reported high values, and total absence of the values 1 or 2.

Within the company, acquisition competencies are not only established by trial and error. Acquisitions stretch limited managerial resources. Many

companies therefore hired managers, often with past acquisition experience, to obtain acquisition competencies.

The acquisition experience was our first, so we had less resources to deal with the issues. In particular, what we lacked was the figure of a Chief Financial Officer ... we did not have a CFO, we had an administrative director, who was, among others, a minority shareholder. He did not have ... I don't want to say he didn't have the preparation, but he didn't have the mental attitude for this type of operation. We hired a CFO immediately after, actually at the same time as the acquisition. It was the CFO of our main competitor [...] He had experience in acquisitions because his company had carried out several acquisitions although they were minor ones; but he certainly had experience with acquisitions.

The hiring of a CFO expert in acquisitions significantly strengthened the company's belief in its ability to evaluate and carry out acquisitions. One general director suggested that a CFO experienced in acquisition processes had the following effects:

His presence did not determine enormous advantages for the acquisition process. But it certainly was an enormous advantage in financial management, both in terms of reporting on the situation – hence, providing knowledge, the element on which decisions are based – and in terms of more advanced financial management.

It was precisely for these reasons that almost all of the surveyed companies introduced people coming from larger companies that had previous acquisition experience. The managers were typically hired at the time of an important acquisition.

If the knowledge obtained in acquisitions and integration of acquired companies is to become an integral part of the organizational memory and if such knowledge is to be correctly recalled when needed, two additional conditions, beyond the simple accumulation of experience, are necessary: the systematic accumulation of organizational memory linked to acquisitions and the creation of structures and managerial practices aimed at correctly “recalling” organizational memory. Evidence of these two processes of capabilities development and use are reported in the next two sub-sections.

Phase 2: Archiving the Lessons Learned: The Accumulation and the Partial Formalization of the Acquisition Competencies Matured

The companies surveyed paid remarkable attention to the organization of the lessons they learned from their own acquisition experiences. Especially in the case of companies that carried out more than one acquisition, we systematically observed the gradual emergence of organizational tools that allow companies to archive and accumulate acquisition knowledge. Companies used such managerial tools and practices to gradually organize knowledge on the

underlying causes of the success or failure they experienced (“know-why”), or the operational means that can ensure success in acquisitions (“know-how”).

Table 5 shows the tools used for archiving the lessons learned from acquisitions. We have classified these tools as: target evaluation tools, tools for the integration of the acquired companies, and specific hiring of managers with past acquisition experience. The analysis suggests that these tools and decisions are more frequent among larger companies with higher growth rates as well as more intense acquisition experiences. This means that such devices are typically introduced gradually and were not considered necessary by smaller companies or those at their first acquisition experience.

Table 5. Growth, Corporate Size and use of Formal Instruments to Support External Growth Processes.

Sales Growth Rate (1997–2002) ^a			
> 100%	Tecniplast (0)	Sabaf (6) (Yes – No – No) Tessitura Candiani (0)	Mapei (9) (n.a. – n.a. – n.a.) Brembo (19) (Yes – Yes – No) Campari (7) (Yes – Yes – Yes) De Longhi (7) (Yes – No – Yes) Tod’s (0)
50–100%	La Sportiva (0)	Ferrarini (1) (Yes – No – No) Illy (0)	Chiesi (6) (n.a. – n.a. – n.a.)
< 50%	Fratelli Sassi (0)	Sifi (1) (No – No – No) Fratelli Carli (0)	E. Zegna (4) (No – No – No) SCM Group (7) (Yes – No – No) Max Mara (n.a.)
Number of employees (2002) ^a			
	< 250	250–1,000	> 1,000

Note: Within parentheses we report, for each organizational entity: (A) number of control acquisitions carried out in the company’s history; (for companies which have carried out at least one acquisition); (B) the presence(Yes)/absence(No) of formal instruments or criteria for target evaluation developed over time; (C) presence/absence of formal instruments or criteria for the integration of acquired firms; and (D) managers hired with the specific purpose of facilitating acquisition/integration processes.

^aWhile we were able to trace the entire history of acquisitions in each firm (e.g., the first acquisitions trace back to 1982 in Chiesi and to 1983 in Brembo), we only have full comparable data on growth and managerial intentions for the period 1997–2002.

A constant element we found was the gradual emergence of simple rules or quantitative parameters capable of offering guidance to those involved in acquisitions. The president of one of the companies most active in acquisitions described the lessons he had learned in 10 years of deals:

I believe that in preparing a plan, you first have to identify the critical variables ... For us a possible acquisition target must have at least one of the following three characteristics: it has to give us a new country, synergies in a country in which we are already present or it has to expand our portfolio and we have to be able to manage it with our current business model. This is what we learned from our business and our acquisition experience. It would be folly to go through with an acquisition that doesn't give you one of these three things; if you did, you would end up with an expensive object you don't know how to manage. It would lose value the minute you purchase it.

An analysis of the competitive characteristics of the targets acquired by this company and the content of subsequent integration processes confirmed that acquisitions carried out by this company brought significant progress along all three lines indicated by top management.

These simple rules were always expressed very clearly by the company heads, and were always repeated, with minimal variations, by the other members of the top management team. This indicates that the lessons have been learned and internalized homogeneously by top management. A consistency of this sort is clearly the fruit of the managerial practices with which the acquisitions were carried out.

First, the company head is personally involved in the acquisition. Second, all managers are actively involved in each stage of the acquisition process – from the identification and evaluation of the target to the integration and management of the acquired companies: “We have a small, well-integrated team in which we can exchange ideas with perfect frankness and we try to achieve, if not global consensus, at least a substantial global consensus... this allows us to react immediately.” In this collective work practice, we can see the presence of interpersonal mechanisms in which mutual respect plays a crucial role. This is something uncommon in most small- to medium-sized Italian companies, in which the entrepreneur tends to overly centralize the main strategic decisions and their execution. This occurs for understandable reasons, but it hinders the effective accumulation of knowledge in the entire management team. As the general director of one of the observed companies noted:

... the chemistry between people, the relative trust between people.... I have full confidence in the person who takes care of the contractual part. So, when he sends me a 500-page contract to sign, I ask him: ‘Did you check everything? Is everything ok?’ I have full trust in our CFO who did all the analyses. The president who is directly involved in the acquisition has faith in us ... faith in me, in my general market vision; he has faith in

the technical people who work with us and so ... The keyword is trust. What I mean is that if I end up having to reread a 500-page contract because my 'absent-minded' co-worker forgot a warrant or entered the wrong price, I'm done. Everybody has to contribute, take their share of responsibility for the part they did and who has to make the final decision must be sure that the person who did that part did it correctly.

As we mentioned earlier, the lessons learned can take the form of simple general guidelines, such as those recalled in the previous examples. Occasionally, they are simple quantitative parameters. For one entrepreneur, the "rule of thumb" that matured over time was the following: "In acquisitions, the 'rule' applied was that of being able to finance at least 50% with own means."

In other cases, over time, at least some of the acquisition processes began to take the shape of real organizational "routines": i.e., behaviors resulting from "learning by doing" that tend to be repeated over time and that personnel carried out almost automatically, i.e., without the need to make an ad hoc decision each time (Cohen & Bacdayan, 1994; Cohen et al., 1996). For example, in one of the cases examined, the financing of a series of acquisitions carried out in a tight time frame followed a previously defined sequence that was the same for all processes: "We contracted a certain type of debt to finance some acquisitions that we carried out almost in sequence." In this way, choosing and finding financial resources for an acquisition – an aspect that has "blocked" many entrepreneurs on the verge of a possible new deal – did not prove to be an impossible task.

Phase 3: Recalling the Right Concepts at the Right Time: Developing Mechanisms to use the Acquisition Competencies Matured

Besides effectively learning and archiving the lessons learned, companies that have carried out more than one acquisition showed that they know how to correctly apply such knowledge. Skills to generate and to leverage acquisition knowledge are generated more by the processes through which the acquisitions are carried out than by tools and formal planning.

The companies included in the sample therefore demonstrated the ability to become aware of their mistakes and the reasons of their success. They were also able to modify their own acquisition behavior over time as a result of the lessons learned. A top executive of one of these companies underlined how past mistakes were the object of reflection and learning that led top management to change its subsequent behavior:

We recently came across some truly unrepeatable opportunities: 10 years ago we wouldn't have thought twice about taking advantage of them. Instead, we decided to forego these acquisitions because experience told us that a growth process must be a 'healthy' growth process that is manageable and within our reach.

The companies observed seem to have adopted a very flexible approach, in which the different principles learned from experience are recalled according to the peculiarities of the operation at hand.

It is essential not to start out with dogmas, with the idea that everything necessarily needs to be done like we were accustomed to doing before ... you have to approach the issues with an open mindset and not with the conviction that you are the guardian of the truth.

This is evident also in the fact that the persons interviewed highlighted the company's growing "ease" in undertaking and completing acquisition processes. But how did these companies manage to employ the right concept at the right time? Acquisition competencies reside in the team of people who have already experienced acquisitions. There are therefore two assumptions to bear in mind. First, the more a management team is involved in the operations and remains stable over time, the easier it will be for the company to promptly access this wealth of accumulated knowledge. Second, in order to correctly employ this wealth of knowledge firms build relationships and mechanisms that involve people. Let us now examine some of the relationships and mechanisms of involvement employed by surveyed companies that carried out more than one acquisition.

In all the examined cases, identification of potential targets was always the result of spontaneous, rather than planned processes. Specific opportunities were identified, thanks to different inputs. The company head always plays a central role in these processes. During the very first acquisition experiences, when it is not the head of the company, it is usually an executive she/he trusts who follows the acquisition almost entirely.

The direct involvement of the head of the company in the identification and evaluation stages of the acquisition, as well as in the closing of the deal and in the subsequent integration process, is therefore the first guarantee that the lessons learned from the past are correctly recalled in subsequent operations.

In general, however, what guarantees the best results is top executives' openness to receiving suggestions from all levels of the organization as well as from outside. The person in charge of business development at one of the companies most active in acquisitions said: "The identification of a target arises from internal intelligence, in which I'd say everybody is involved. Everyone in the company shares the policy of growing through acquisitions. Anyone in the organization, even at the intermediate level, who identifies a potential target, takes it upon him/herself to bring the possibility to the attention of top management."

It is especially in the acquisitions following the first, that the gradual development of a dedicated, albeit not full-time, management team that follows the most sensitive stages of each acquisition is noticeable.

Once the target company has been identified, the entrepreneur gives the Central Director of Strategic Planning, who's been with the company since 1994, and his daughter, who also works in the Strategic Planning Department, full powers to proceed with the operation. At this point the two make use of the collaboration of teams created ad hoc, which include professionals involved in virtue of their past experience or suggested contacts.

Over time, a growing number of people within the company are systematically involved.

In some ways, people grew with the business. People became more interested as the acquisition policy progressed. And certainly, at a certain point, the decision to create a business development function seemed almost natural, precisely because expansion by external lines had already become a structural part of our business.

Involvement usually occurs in periodic meetings, real "organizational routines" of the acquisition process. As the same head of business development specified:

Of course, once the deal has been closed, we hold periodic meetings at different levels to verify integration, because there is a strategic level and then there are operational levels at which we normally establish integration committees that include our representatives as well as those of the company to be integrated ... But at the strategic level, right after the acquisition, we have top management meetings twice a month during which we review the progress of integration. Once the acute phase is over we carry out periodic analyses ... This has been happening for several years. At least since our second acquisition.

The integration of the acquired company requires particular involvement by managers at all levels. Integration not only involves operational aspects but also those related to organizational culture. In the more complex organizations surveyed, it was common to facilitate integration by inviting the directors to also sit on the board of the acquired company. One company organized a convention every year to which dozens of directors of different levels were invited, in addition to cross-board meetings and frequent meetings of the directors of all group companies. The purpose was to integrate the organizational cultures and to allow management to internalize the lessons learned from external growth.

Flexibility and speed in decision making of the top levels of the company certainly aided them in correctly recalling the lessons learned at the right time. Flexibility and speed were in turn guaranteed by the already mentioned management team's mutual trust and the ability to work together,

but also by the typically concentrated ownership structure of the companies surveyed as well as by the role played by the board of directors. Trying to explain the determinants of success in acquisitions one entrepreneur, for example, stated:

A lot depends on our flexibility, that is on the fact that we have a lean decision-making process, top managers who are married to the company for life and so they don't worry about the next twelve months but about the next twenty years and on the fact that they feel supported by owners, who, once they have given the go-ahead, respect that decision. Clearly, in a public company the first objective would be to keep the chair, and then see about the rest. This is one of our great competitive advantages.

Many of the people interviewed on the topic, spontaneously compared the decisional paths the acquisition processes implied in their companies with those of their main competitors, large multinationals with a widespread ownership base.

We see less flexibility and speed in decision-making in our competitors. We probably see these characteristics less because they're public companies, or because they are larger, and therefore have a more complicated bureaucratic process. Our competitors have longer reaction times. They need to work more on achieving internal consensus and are therefore less reactive and in certain moments you're playing with, I won't say hours, but days.

Tight control over the surveyed companies aided not only the speed of action but also the quality of the decisions made. We already mentioned the greater sensibility to the needs of the persons selling the company. The other aspect, though, is the long-term vision that allows the companies studied to take risks shareholders of a typical public company would turn up their nose at. Once again in the words of the already mentioned entrepreneur:

What further helped us was the fact that, although we are listed, we still have tight control over the company, so we can take a bit more risks. When the seller, for example, is allergic to 'warranties', perhaps because it is a mutual fund that can't take them, and it has some commitments it needs to honor if it wants to resell ... now, if we are convinced that the object is good, we are willing to take some risks. And, I would say, this approach paid off.

The advantages of this type of control are systematically underlined also by managers who are not a part of the ownership structure.

I would say this is due to the very simple control structure that makes the relationship with the shareholder easy and direct and – let's admit it – it also allows the people to gather round a table and decide together. Clearly in very large groups, it takes a long time before the decision reaches the headquarters some place out in the Midwest and comes back. This is a very important aspect.

DISCUSSION

Virtuous External Growth Processes: An Emerging Model

This chapter explores patterns of acquisition growth by SMEs, and the concurrent development of acquisition and integration capabilities. Focus is on the initial decision to pursue growth by acquisitions, on the creation and storage of acquisition knowledge and on the subsequent use of accrued capabilities, over time. Fig. 2 summarizes the insights that emerge from our study.

Understanding the emergence of acquisition capabilities in SMEs offers a novel perspective in addressing a key question in entrepreneurship research – how and why some growing firms successfully make it in avoiding the traps inherent in resource maturity and arising simplicity, while others do not (Churchill & Lewis, 1983; Davidsson, 1989, 1991; Miller, 1993; Vermeulen & Barkema, 2001). Our results are also relevant to the literature on mergers and acquisitions, which has only recently started to address the issues of acquisition capabilities emergence (Zollo & Singh, 2004).

Individual phases in the model are described in the previous sections. However, Fig. 2 makes clear that our model implies a mingling of different learning processes within the organizational entity (Hayward, 2002). Alongside the knowledge accumulated by carrying out acquisitions and subsequent integration processes, there are other processes such as: the development of formal tools that support growth (managerial, financial, accounting and control, operations control, etc.), the internalization of the lessons learned, the internalization of the acquisition/integration model gradually developed, the internalization of the new model of company that gradually arises from the acquisition processes (e.g., “we are a company: that grows by external lines; that sticks to certain principles in selecting targets, in deals, in integration, etc.”), and the development of routines and mechanisms for correctly recalling accrued capabilities.

The Emergence of Acquisition Absorptive Capacity

The activities, artifacts and cognitive processes illustrated in Fig. 2 and throughout the chapter are all instances of the development of routines and capabilities (Dosi, Nelson, & Winter, 2000; Kogut & Zander, 1992; Winter, 1987; Zollo & Singh, 2004). Our data show that the capabilities and routines which developed along the acquisition and integration processes we observed are of a very special kind. Namely, they are *components of an SME's absorptive capacity to gradually learn from early experiences how acquisitions*

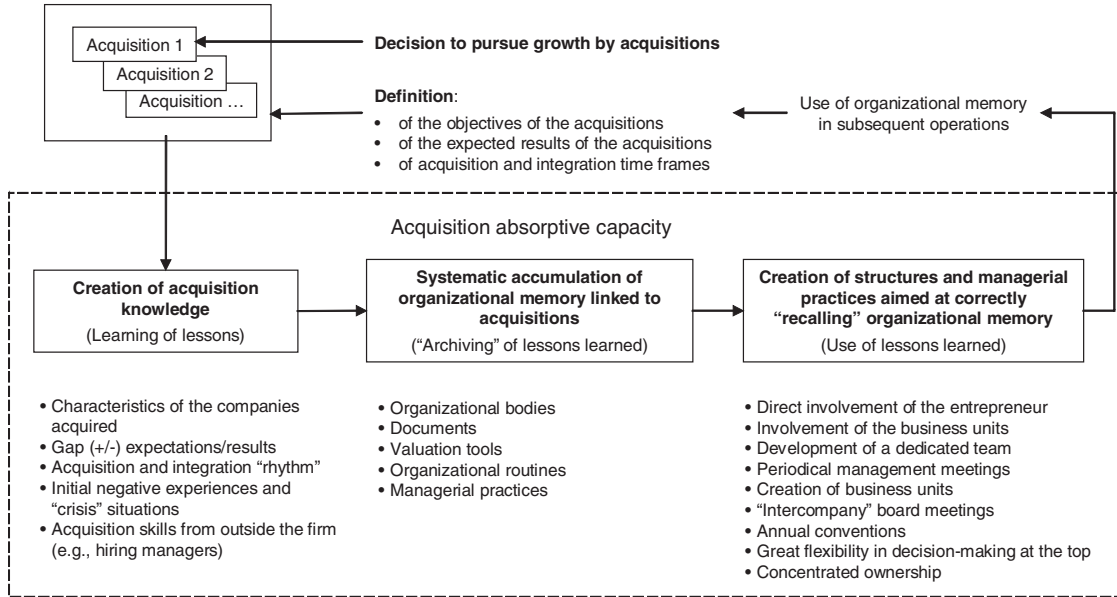


Fig. 2. A Process Model of Acquisition Capabilities Development in SMEs.

should be carried out, and how such knowledge can be accurately retrieved in subsequent operations.

According to the original formulation offered by Cohen and Levinthal (1990, p. 128), absorptive capacity (ACAP) is “an ability to recognize the value of new information, assimilate it, and apply it to commercial ends.” Subsequent conceptualizations have developed specific aspects of this initial definition. According to Mowery and Oxley (1995), for example, ACAP is a broad set of individual skills through which an organization manages the tacit component of transferred knowledge, modifying it for its internal purposes. Kim (1998) offers a definition of ACAP as a capacity to assimilate knowledge for imitation (a “learning” capability), and to create new knowledge for innovation (a “problem-solving” capability). Finally, in an effort to build an encompassing reconceptualization of ACAP, Zahra and George (2002, p. 186) define it as “a set of organizational routines and processes by which firms acquire, assimilate, transform and exploit knowledge to produce a dynamic organizational capability.” In the SMEs we investigated, the configuration of ACAP is that of a set of capabilities by which firms acquire, assimilate, transform and exploit knowledge to acquire and integrate targets.

Developing and Storing Acquisition Knowledge

A first dimension of ACAP which impacts on a firm’s ability to carry out acquisitions is given by processes aimed at acquiring and assimilating external knowledge. This process can be seen as composed by the two sub-processes of *acquisition* (a firm’s capability to single out and to access knowledge considered relevant to its purposes) and *assimilation* (a firm’s capability to analyze, process, interpret and understand knowledge). Together, these two dimensions constitute what Zahra and George (2002) named Potential Absorptive Capacity (PACAP).

The relatively limited resource endowment of SMEs curbs their ability to recognize and to enact the value of acquisitions. Hence, any organizational arrangement aimed at improving an SME’s access to acquisition knowledge will significantly improve its prospects of successfully identifying, acquiring and integrating targets. Acquisition ACAP in the firms we observed developed through a learning process with three characteristics.

First, the initial experiences – whether positive or negative – and “crisis” situations determined gaps between early expectations and actual results, which are the triggering events of capability learning (Argote, 1999; Winter, 2000).

Second, such learning was particularly effective when the characteristics of acquired companies were not too dissimilar from those of the acquirer, and

when the pace of subsequent acquisitions was manageable by the organizational entity. According to M&A literature, learning from acquisitions can only take place if there is a flow and recombination of knowledge, routines, skills and people between the acquired and the acquiring company (Capron, 1999; Lubatkin, Calori, Very, & Veiga, 1998; Vermeulen & Barkema, 2001). Such interchange takes place when the differences between organizations involved are limited like, for instance, when the acquired company operates in a closely related business and geographical area, and is characterized by a similar culture or strategic makeup (Larsson & Finkelstein, 1999).

Finally, we noticed that acquisition and integration knowledge which is not internally developed by firms through experience is accessed by hiring managers having the needed skills and experience. Here, we observed how some SMEs have even hired managers with acquisition and integration experience *before* such skills became relevantly needed. Such foresight is a characteristic of SMEs which excel in managing rapid growth, as they are often observed as hiring and developing today the managerial team which is needed for tomorrow (Churchill & Lewis, 1983; Fombrun & Wally, 1989; Hambrick & Crozier, 1985).

Studies investigating the characteristics of managers' previous experience within high-growth firms found that "having experience in an industry similar to that of the firm" often discriminates between low- and high-growth firms (e.g., Siegel, Siegel, & MacMillan, 1993). In contrast, a peculiarity we observed is that unlike in the management of rapid *organic* growth, managers hired to manage future acquisitions do not necessarily come from the same industry. Rather, the skills which are sought by the externally growing firm are skills for using sophisticated managerial tools and for managing complex organizations, in whatever industry and business context they have been developed.

Absorptive capacity is an organizational concept. Hence, PACAP will not result only from individual knowledge bases, but also from transfers of knowledge across and within organizational subunits. Hence, organizational arrangements aimed at transferring acquisition knowledge within the organization will likely improve ACAP and the firm's ability to successfully carry out acquisitions. Evidence from our case studies suggest that the most effective organizational solutions used by our firms to accumulate organizational knowledge linked to acquisitions are (see Fig. 2): documents aimed at archiving "lessons learned" (Bresman, Birkinshaw, & Nobel, 1999); valuation tools aimed at accessing external knowledge or at making explicit internally developed heuristics; managerial practices and routines embodying both explicit and tacit acquisition and post-acquisition integration knowledge (Zollo

& Singh, 2004); and the development of organizational bodies – like an M&A managerial task force – providing an organizational arena where cumulated knowledge may reside (Zollo & Singh, 2004; Zollo & Winter, 2000).

Together, resources accessed through hiring external managers, and formal instruments for evaluating targets and integrating acquired companies, allowed firms in our sample to develop a palette of external-growth competences. Such competences resulted in perception of greater acquisition success as evidenced by Table 6.

Realizing the Potential of Cumulated Acquisition Knowledge

The effects of previous acquisition experiences can be positive or negative depending on the degree of similarity between previous acquisitions and those underway. Many companies mistakenly applied the lessons learned in previous acquisitions to subsequent operations involving companies that were too different for the same solutions to be effective.

Even when targets are similar, effective knowledge transfer is not given. Transferring learned solutions to subsequent operations is not only an objective problem of similarity or difference between past acquisition experiences, but also of present or future experiences. Companies also have the subjective problem of the managerial team's ability to correctly perceive such similarities or differences.

Only if it has developed this ability can management avoid two recurrent mistakes in managing acquisitions (Haleblian & Finkelstein, 1999). The first mistake is managing the acquisitions underway – similar to operations carried out in the past – as if they required a different approach and responded to a different logic. It is therefore not uncommon to see companies pay too much for a target, when they made the same mistake in the past; or acquire a company with a very strong and different culture, when the same choice had created problems in the not too distant past. The second mistake, opposite to the first, consists in managing different acquisitions with a similar approach, seeing superficial similarities between past and present operations that hide great structural differences.

These problems can be conceptualized as the need to correctly recall stored acquisition knowledge and skills, and to effectively recombine them with new information and knowledge involved in each new acquisition process. A need, which is addressed by the second dimension of ACAP – processes aimed at transforming and exploiting stored knowledge. Transformation of knowledge refers to “a firm's capability to develop and refine the routines that facilitate combining existing knowledge and the newly acquired and assimilated

Table 6. Formal Acquisition Practices, Development of Competences and Overall Satisfaction with Completed Acquisitions.

Firm/Group	Managers Hired to Facilitate Acquisitions	Target-Evaluation Instruments	Target-Integration Instruments	Developed Competences	Missing Competences	Overall Assessment of Acquisitions (Scale 1–7)
Brembo	Yes	Partially	Partially	Target valuation	n.a.	6/7
Campari	Yes (several functions)	Yes	Yes	Target valuation/ability in interacting with targets	n.a.	7
Chiesi	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
De Longhi	Yes (corporate development)	No	No	Better understanding of acquisition steps, better use of consultants, and closely monitoring acquired firms while keeping autonomy	Consensus creation within the acquiring firm before the deal	7

Ferrarini	No	Yes	No	No	n.a.	7
Mapei	Yes (strategic planning)	Yes	Yes (meetings)	Planning acquisition phases. Transferring practices	Integrating different cultures (e.g., family vs. managerial)	5/6
Sabaf	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
SCM	No	Partially	No	Target valuation	n.a.	6
Sifi	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Zegna	Yes	No	No	Planning acquisition phases. Transferring practices	n.a.	6/7

Note: Data reported in this table result from triangulation of evidence from semi-structured interviews and questionnaires to managers at different levels of each organization.

knowledge” (Zahra & George, 2002, p. 190). In turn, knowledge exploitation refers to a firm’s capability “to refine, extend and leverage existing competencies or to create new ones by incorporating acquired and transformed knowledge into its operations” (*ibid.*, p. 190). Together, transformation and exploitation constitute Realized Absorptive Capacity (RACAP).

Several factors affected the ability of firms in our sample to exploit externally accessed information, recombining it with internally available knowledge, as shown in Fig. 2.

The transfer of previously developed acquisition knowledge was facilitated by the direct involvement of the entrepreneur in most, if not all, acquisitions, and by the development of dedicated teams of managers, meeting periodically to evaluate new deals, to conclude them or to manage post-acquisition integration. Similarly, interlocking directorates within the group facilitated the transfer of resources and competences, in line with results of previous studies on knowledge transfer in international acquisitions (e.g., Bresman et al., 1999; Marks & Mirvis, 2001; McEntire & Bentley, 1996).

These organizational arrangements helped in overcoming one of the big obstacles to successfully exploit cumulated knowledge in acquisitions: lack of time. Alongside previously mentioned difficulties, acquisitions – and, often, subsequent integration processes – must be concluded with speed. Owing to the time pressures that characterize almost all acquisitions, such operations are almost always identified, evaluated, carried out and completed exclusively by top management. There is hardly any time to consult the functional and divisional heads, the directors and managers within the company, who could offer valuable knowledge acquired in past operations: important bits of collective information that, due to objective time constraints or pressing reasons of confidentiality, cannot be gathered and fully exploited (Haleblian & Finkelstein, 1999; Jemison & Sitkin, 1986). Systematic and often formalized involvement of the entrepreneur and of managers at different hierarchical levels within most of the firms we observed, offered an effective means to partially overcome this problem.

Communication within the acquirer’s organization – e.g., by involving business units in the acquisition processes, or by organizing annual conventions – resulted as a valuable tool in boosting employee morale after mergers. These are all ways of recognizing the need to raise employees’ awareness and understanding of the merger and the importance of building commitment to new strategic directions. These findings extend those of studies focusing on the need for management to provide employees with information about mergers and acquisitions. Several authors highlight the importance of management–employee communication, holding of discussions on major

decisions in the consolidation process and employees' resignation due to lack of information on mergers (Larsson & Finkelstein, 1999; Mai, 2000; Nauert, 2000). Similarly, in our cases of interaction and coordination during the integration process, and the resulting lack of employee resistance to the combined entity, were a significant aid in fulfilling synergy realization.

Absorptive Capacity, External Growth and Entrepreneurial Value Creation

As suggested by current conceptualizations, ACAP is a dynamic capability for knowledge creation and knowledge deployment (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997; Zahra & George, 2002). In turn, such capability allows firms to build other organizational capabilities, like the recognition of acquisition opportunities and resource transfers and recombinations which create value out of post-acquisition integration (Haspeslagh & Jemison, 1991; Vermeulen & Barkema, 2001; Zollo & Singh, 2004).

Given their nature of specific processes and organizational routines (Dosi et al., 2000), there will be similarities across different organizations in the ways they access, store, retrieve and exploit external and internal knowledge to carry out acquisitions and post-acquisition integration. However, given their local and path-dependent evolution, dynamic capabilities are highly idiosyncratic in the specific ways firms pursue, develop and employ them (Eisenhardt & Martin, 2000). The concept of ACAP as a dynamic capability allowing firms to improve their chances of successfully carrying out acquisitions may hence provide a suitable starting point to understand why and how acquisitions may become value-creating entrepreneurial activities within the organizational entities which carry them out.

To pursue these goals we have identified the individual components of acquisition ACAP and their organizational determinants – determinants which may be subject to managerial action aimed at improving resulting phenomena.

CONCLUSIONS AND IMPLICATIONS

Our research allows us to identify lessons that were particularly effective for the companies surveyed, notwithstanding the presence of rather heterogeneous growth paths in the sample and the different amount of acquisition experience among investigated companies.

There is a dominant theme: external growth can be a source of entrepreneurial opportunities and development or it can be a threat to the

profitability of SMEs, depending on the ability to build learning paths on this experience. SMEs often see obstacles in acquisitions linked to: controlling the vigorous growth process; negative financial consequences of borrowing money for acquisitions; and the difficult and often painful management of integration among organizations that are sometimes very different (Delmar, Davidsson, & Gartner, 2003; Levie, 1997; Wiklund, Davidsson, & Delmar, 2003).

However, the companies that, willingly or reluctantly, decide to embark on this path can draw on the competencies that gradually mature in these situations. This occurs as long as the acquiring companies are able to establish the conditions in which these learning processes can take place, developing principles that can be correctly recalled when necessary. Only in this way can the inevitable initial mistakes and the possible crisis situations be transformed into lessons for the future.

These conditions are linked, first of all, to the type of operation carried out. Learning is easier when the acquired organizations are not too different from the competitive and production standpoint, but also from that of organizational culture and shared values. The development of competencies is easier when there are clear and tangible potential benefits at the root of the operation. But the learning conditions are linked above all to managerial practices, to operational procedures and to the tools and logic the surveyed companies used to generate, accumulate and use the knowledge generated by the acquisition process.

While none of the surveyed companies had specific skills before its first acquisition, our research shows that they were able to gradually learn. This did not prevent difficulties from arising in subsequent acquisitions. However, lessons learned allowed them to interpret external growth processes more as an opportunity than as a threat, adding an effective tool to their repertoire of skills for survival and sustainable success.

Emerging “lessons” concern, first of all, the characteristics needed for a potential acquisition target to be interesting. All the companies we analyzed were aware of the characteristics a company must have to be evaluated for the purpose of an acquisition. In other cases, the lessons learned involved ways of conducting the deal: how to carry out negotiations; the degree of flexibility in meeting the needs of the seller; the decision to take risks that go beyond those already implied in the standard contract; and whether or not to make recourse to the help of a merchant bank. And last, the experience internalized can relate to the integration process of the acquired companies. Rarely do the lessons learned involve formal rules. More often they offer principles of flexibility learned from experience.

For owners and managers of small businesses, understanding the process of acquisition-competence development can aid in assessing current challenges. It can help in anticipating the key requirements at various points in external growth patterns, from the decision to pursue growth by acquisitions, to the recurrent use of systematically developed and accrued knowledge (Churchill & Lewis, 1983). These are very specific messages, valid for the managerial team that has gradually distilled them and they cannot be generalized. For the company, however, they represent a wealth of precious knowledge through which it can continue the external growth path avoiding several obstacles. This knowledge becomes part of the corporate “genome,” and is no longer linked to key-managers turnover.

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HOW CORPORATE VENTURE CAPITALISTS ADD VALUE TO ENTREPRENEURIAL YOUNG FIRMS

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Technology-based new firms are, in general, highly dependent on external resources such as financing (Jarillo, 1989; Pfeffer & Salancik, 1978; Stinchcombe, 1965). To finance their growth, high potential ventures have commonly turned to venture capital investors, who have been shown to provide not only money, but also, often valuable, hands-on help and expertise in turning new ventures into successes (Hellmann & Puri, 2000, 2002; Sapienza, 1992). However, independent venture capitalists are not the only alternative source of finance and value-adding support for technology-based new firms.

During the past decade, industrial corporations have become an important group of actors in making venture capital investments focused on high potential but unproven new technology-based firms (Gompers & Lerner, 1998; Maula & Murray, 2002). However, from the perspective of entrepreneurs, choosing a corporate venture capital (CVC) investor is a major decision with potentially significant long-term consequences (Dushnitsky, 2004; Gompers & Lerner, 1998; Hellmann, 2002; Kann, 2000; Maula & Murray, 2002).

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Compared to traditional venture capitalists, CVC investors often have a close connection to their parent corporation. This connection brings both advantages and disadvantages (Hellmann, 2002; Maula & Murray, 2002). While having a close connection to a major corporation may help corporate venture capitalists provide a young start-up with valuable corporate resources, there is also a risk of a conflict of interests between the start-up company and the parent company of the corporate investor (Dushnitsky, 2004; Hellmann, 2002; Kann, 2000). Regardless of intentions, it is not always easy to avoid conflicts of interest and realize the full potential benefits.

Given the important role of corporate investors in the venture capital markets and the material benefits that can arise from successful relationships, it is important for entrepreneurs to understand what the key factors to consider are when selecting a corporate investor(s). Post-selection, the relationship has also to be managed and nurtured if reciprocal benefits are to be maximized. To date, there has been little rigorous empirical research focusing on the benefits entrepreneurs receive from CVC investments (Kelley & Spinelli, 2001; Maula & Murray, 2002). This paper seeks to fill this gap by focusing on the mechanisms through which corporate investors add value to their portfolio companies and on the factors influencing those mechanisms.

This paper examines CVC from the perspective of *technology-based new firms* (Shrader, 2001; Yli-Renko, Autio, & Sapienza, 2001; Zahra, Ireland, & Hitt, 2000). Our reasons are two-fold. First, much of the present literature takes a corporate rather than an entrepreneur's perspective (Dushnitsky & Lenox, 2005a, b; Keil, Maula, & Zahra, 2004). Secondly, the logic of this activity is fundamentally linked to the established firm's need for continuously learning and innovation. Technology-based new enterprises are particularly attractive in their Schumpeterian ability to think and act differently. Similarly, CVC investors can also have a significant influence on the resource acquisition and subsequent performance of technology-based new firms (Gompers & Lerner, 1998; Hellmann, 2002; Maula & Murray, 2002).

The main unit of analysis in this paper is the relationship between a technology-based new firm and its most important CVC investor, with importance here being measured in terms of ownership share. By analyzing the firm dyads, this paper also extends the existing body of literature on interorganizational relationships. Current theory is largely dominated by research that documents relationship activity to arrive at network structures. Specific dyadic relationships are a less well-researched area (Stuart, 2000; Yli-Renko et al., 2001).

Building on received theories and empirical research, the present paper develops and validates an integrated multi-theoretic model of the

value-added mechanisms and the factors influencing the value-added mechanisms in the relationships between new firms and their CVC investors.

One of the key perspectives of this analysis is the resource-based theory of the firm, which views firm resources as the primary determinant of the competitive advantage of the firm (Barney, 1991; Penrose, 1959). It is recognized that technology-based new firms often lack some critically important complementary resources typically possessed by large, industry-leading corporations (Teece, 1986). Therefore, resource-combining alliances with large corporations are often an important strategy for technology-based new firms (Deeds & Hill, 1996; Eisenhardt & Schoonhoven, 1996; Park, Chen, & Gallagher, 2002; Rothaermel & Deeds, 2002; Rothwell, 1983). Complementarities are seen as an important determinant of the potential for value creation in resource-combining relationships between two companies.

The knowledge-based view suggests that knowledge is the most valuable source of competitive advantage in a firm (Grant, 1996). Technology-based new firms are necessarily limited in their knowledge of markets, competition, and technologies and can potentially benefit from vicariously acquiring knowledge from large industry-leading corporations. There are few opportunities outside CVC investment where firms of such extreme differences of size and experience can share resources.

While the utility of complementary resource exchange is well understood (Laamanen & Autio, 1996; Rothwell, 1983), it is not evident that this value creation potential will automatically be realized in these disparate relationships (Madhok & Tallman, 1998). Accordingly, social capital has been recognized as having an importance facilitating role in such intra- and interorganizational relationships (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998; Yli-Renko et al., 2001). This paper applies social capital theory in explaining some of the variation in the level of resource and knowledge acquisition by portfolio companies from their corporate investors. Importantly, it argues that social capital is not exogenously determined. Rather, it is endogenous and is influenced by initial conditions and the corporations' incentives to invest in collaborative working relationships.

With liabilities resulting from a limited track record and a high risk of failure, technology-based new firms have difficulties in accessing external resources (Aldrich & Auster, 1986; Stinchcombe, 1965). It has been argued that prominent exchange partners may help to certify and signal the quality of young ventures. These endorsements improve the legitimacy of new firms and make it easier for them to attract new investors and partners (Stuart, 2000; Stuart, Hoang, & Hybels, 1999).

The present paper seeks to contribute to the literature by developing an integrated model of the value-added mechanisms and of the factors influencing those mechanisms. By building the model on the basis of received theories and empirical research in related fields, and by testing the model and hypotheses by means of both primary and secondary data, the present study attempts to create a better understanding of CVC and the value-adding process. In so doing, the present study also hopes to contribute to the larger body of literature on interorganizational relationships. The findings have also important practical implications for those entrepreneurs selecting new investors or managing existing investment relationships with CVC investors. The results of the integrated model are also highly relevant for corporate venture capitalists and venture capitalists seeking to maximize their investment performance.

The rest of the paper is structured as follows: Section 2 reviews the underlying theories and develops the hypotheses. Section 3 describes briefly the methodology including the sample, the operationalization of the variables, and the statistical methods. Section 4 describes the empirical results of the study. Finally, Section 5 discusses the conclusions of the research, including interpretations of the findings and their theoretical and practical implications.

THEORY AND HYPOTHESES

The present study develops a multi-theoretic framework of the mechanisms of value creation in interorganizational relationships and of the key factors influencing those mechanisms. The integrative use of several theories in building the model is justified by numerous studies suggesting that a multi-theoretic approach is required to understand the complexity of interorganizational relationships (Gulati, 1998; Osborn & Hagedoorn, 1997; Park et al., 2002). We believe that the relationships between start-up companies and their corporate investors, with each party holding a diversity of strategic and financial objectives, are not less complex than other potential interorganizational relationships. They may therefore also require ideas from several theories to be properly understood. In this study, we build the models applying primarily the resource-based and the knowledge-based views, as well as social capital theory. Ideas from other theoretical approaches are used to complement these theories.

In the present study, the resource-based view (Barney, 1991; Penrose, 1959) is used to derive predictions on the influence of resource complementarities

on the motivations of large corporations to deepen the investor–investee relationship beyond a purely financial relationship. Although some of the first papers on the resource-based view focused on the internal resources possessed or directly controlled by the firm, later research has increasingly recognized the role of interorganizational relationships in building ‘bundles of resources’ that are valuable, rare, non-imitable, and hard to substitute (Chung, Singh, & Lee, 2000; Das & Teng, 2000; Deeds & Hill, 1996; Eisenhardt & Schoonhoven, 1996; Rothaermel & Deeds, 2002). The resource-based view has been used to explain the potential value of external resources and also the factors influencing creation of interorganizational relationships. Complementarities between two firms have been identified as a key factor in creating value through the combination of resources and thereby making one firm an attractive partner for another (Eisenhardt & Schoonhoven, 1996; Park et al., 2002). According to Eisenhardt and Schoonhoven (1996): “co-operation requires resources to get resources.” In this sense, the resource-based view takes a more proactive approach to resource acquisition than the resource dependence perspective (Pfeffer & Salancik, 1978), which suggests that firms, especially small firms, are dependent on their environment for acquiring critical resources. However, the resource dependence perspective provides less understanding on how resources are used to create value and what enables resource combining interorganizational relationships (Park et al., 2002). Organizational economics, especially agency theory and game theory, provide further understanding of the motivation of partners to collaborate and not to underinvest in the relationships (Alvarez & Barney, 2001).

The line between the resource-based view and the related knowledge-based view is not very clear in part because of the broad definitions of the key concepts employed in these literatures (Eisenhardt & Santos, 2001). In this study we examine separately on one hand *tangible* resources like distribution channels and production facilities and on the other hand *intangible* resources such as knowledge of markets, competition, and technologies that help ventures make better use of their scarce resources (Penrose, 1959; Wiklund & Shepherd, 2003).

The knowledge-based view has been applied extensively in research examining knowledge transfer across organizational boundaries (Kogut & Zander, 1992; Lane & Lubatkin, 1998). We use the knowledge-based view to develop hypotheses on the role of knowledge acquisition in value creation and on the factors affecting the knowledge acquisition.

While the knowledge-based view recognizes the problems in transferring knowledge (especially tacit knowledge) over organizational boundaries

(Kogut & Zander, 1992; Lane & Lubatkin, 1998), social capital theory helps to explain the factors facilitating the transfer of knowledge and/or opportunities for collaboration over organizational boundaries (Nahapiet & Ghoshal, 1998; Yli-Renko et al., 2001). Extant research has found social capital (particularly social interaction) to be an important facilitator of resource and knowledge exchange (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998; Yli-Renko et al., 2001).

Besides facilitating resource and knowledge acquisition, interorganizational relationships have also been found to create endorsement benefits (Podolny, 1993, 1994; Stuart, 2000; Stuart et al., 1999) and to reduce the problems resulting from asymmetric information (Booth & Smith, 1986; Megginson & Weiss, 1991). These endorsement benefits have been shown to be particularly valuable when the quality of the focal company is uncertain (Stuart, 2000; Stuart et al., 1999). In the present study, sociological theories on interorganizational endorsements (Stuart, 2000; Stuart et al., 1999) are supplemented with ideas from asymmetric information and signaling theory as well as from the transaction cost economics. Asymmetric information theory (Akerlof, 1970) argues that the more uncertainty there is about the true quality of the venture, the more valuable certification is likely to be. It also argues that the more costly the signaling is for the focal firm, the more credible the signals are (Spence, 1973). Transaction cost economics argue that when asset specificity and switching costs are high, there will be a high need for safeguards against opportunism and uncertainty in exchange relationships. Considering prominent partners as certifiers protecting against opportunism and other risks, the value of interorganizational endorsements is likely to be higher when there are high transaction costs between the start-up company and its potential customers and partners (Swaminathan, Hoetker, & Mitchell, 2001).

Value-Adding Mechanisms

In earlier survey research on CVC (McNally, 1997), corporate venture capitalists have been suggested as providing various forms of value-added services for their portfolio companies. In this section, we develop hypotheses on three specific theoretically and empirically grounded mechanisms of value-added benefits that are hypothesized to account for the majority of the value-added received by portfolio companies from their CVC investors. The three forms of value-added are (1) resource acquisition, (2) knowledge acquisition, and (3) endorsement. *Resource acquisition* refers to the concrete resources of the parent corporation of the corporate investor that the start-up company

gets access to through the investor relationship. *Knowledge acquisition* refers to the learning and experiential benefits the start-up gains in an investment relationship with a corporate investor. Finally, *endorsement* refers to the external legitimization the start-up company receives from the investment by the corporate investor. Resource acquisition, knowledge acquisition, and endorsement are all hypothesized to be positively related to the value-added received from the corporate investor. These forms of value-added are hypothesized to account for most of the value-added received. These forms of value-added and the related hypotheses are discussed more thoroughly in the following paragraphs.

Resource acquisition. In relationships between technology-based new firms and corporate venture capitalists, the corporate parent often possesses complementary resources of considerable value to the young firm including access to distribution channels, production facilities, intellectual property, and input products and services at lower cost. Global scale corporations have typically developed sophisticated distribution channels spanning several markets. Access to foreign markets is a major barrier for technology-based new firms. Similarly, technology-based new firms are often superior in developing technology and new products but inferior in putting the product in large-scale production (Teece, 1986). Access to the production facilities of large corporations would be valuable for young firms in many industries that wish to rapidly scale up their production. Yet another area of potential resource complementarity is the research and development of the parent corporation.

Further, there are situations where technology-based new firms develop technologies or products that are conditional on the existence of the complementary technologies of large corporations in order to be able to be sold. Similarly, technology-based new firms may develop products or services where other products or components or services by large corporation are needed as inputs. Preferential access to such products or services of a large corporation is likely to be a critical advantage for a technology-based new firm. These resource-combining relationships can be classified in two groups: (a) access to resources related to *production* and (b) access to resources related to *distribution*. These categories are consistent with other dichotomies of resource-combining relationships, for example upstream and downstream strategic alliances (Rothaermel & Deeds, 2002).

Hypothesis 1a. The greater the acquisition of production-related resources from the corporate investor, the greater the value-added for the portfolio company.

Hypothesis 1b. The greater the acquisition of distribution-related resources from the corporate investor, the greater the value-added for the portfolio company.

Knowledge acquisition. There exists a substantial literature on knowledge acquisition via reciprocal relationships between small and large firms. While many of these studies have examined large corporations learning from small firms, several studies have also examined the value of knowledge acquisition by technology-based new firms from larger corporations (Forrest & Martin, 1992; Shan, Walker, & Kogut, 1994; Yli-Renko et al., 2001). For instance, Yli-Renko et al. (2001) demonstrated that knowledge acquisition from key customers influenced the new product development, technological distinctiveness, and sales costs of technology-based new firms. While there appears to be little empirical research focusing on the value of knowledge acquisition by new firms from their CVC investors, the existence of learning benefits in CVC investments has been suggested in a previous research (Kelley & Spinelli, 2001; Maula, Autio, & Murray, 2003; Maula & Murray, 2002).

Important for the creation of value through knowledge acquisition is the existence of complementary knowledge. There are various potential areas of knowledge often possessed by large corporations that would be non-redundant and valuable for technology-based new firms should they gain access via a close relationship with their corporate investors. For instance, large corporations commonly conduct research on much broader scale than small start-up firms. Although it is often new entrants to an industry that engender radically novel ideas (Tushman & Anderson, 1986), industry-leading corporations in systemic business environments have a significant power to influence which new technologies are adopted and become dominant within the sector. Leading corporations typically create very detailed, strategic 'road maps' as to how they see individual technologies and their market potential developing over time. This intelligence can be of major value to the young firm starting or expanding its sales activities. Thus, access to complementary, technological information from the corporation may generate major savings in cost and, critically, time. It may also represent a material reduction in both market and technology uncertainties given the superior intelligence resources and sector influence of the corporation.

While commonly having a very detailed understanding of a very specific technology process or application, technology-based new firms can sometimes lack a broader perspective on the market and customer needs. Conversely, corporations spend large amounts of money on their market research and operate globally. From their existing customer relationships,

they have a different and deeper understanding of the *contemporary* market needs than a start-up developing a product for future markets. The wider experience, including market research, of large corporations may be invaluable for a technology-based new firm.

Corporate investors can likewise provide their portfolio companies with valuable information on competitor firms. Whereas technology-based new firms are focused on their product development, they often have little resource for competitor intelligence. Conversely, large corporations have little choice but to track competitors continuously. Access to competitor research may be valuable for the myopic, technology-based new firms.

Hypothesis 2. The greater the knowledge acquisition from the corporate investor, the greater the value-added for the portfolio company.

Endorsement. Several streams of research have argued the influence of prominent exchange partners in providing positive endorsement benefits for new ventures. For instance, a stream of research building on asymmetric information theory has demonstrated the role of prestigious venture capitalists (e.g. Megginson & Weiss, 1991), underwriters (e.g. Beatty & Ritter, 1986; Booth & Smith, 1986; Carter & Manaster, 1990), and auditors (e.g. Titman & Trueman, 1986) in reducing the problems of asymmetric information between insiders and outside investors. Similarly, organizational sociologists have demonstrated that prominent partners improve the legitimacy of new ventures through implicit status transfer in the interorganizational relationships (Stuart et al., 1999). Although previous research has not focused on the endorsement provided by corporate venture capitalists, the descriptive results of McNally (1997) suggest that endorsement might be an important non-financial contribution of CVC investors. Similarly, Maula and Murray (2002) argued that endorsement would be an important form of value-added by corporate investors. Therefore, we hypothesize that prominent CVC investors can provide their portfolio companies with endorsement benefits.

Hypothesis 3. The endorsement effect associated with the corporate investor is positively related to the value-added for the portfolio company.

Factors Influencing Resource and Knowledge Acquisition

Complementarities influencing social interaction. Ghoshal and Moran (1996) argued that three conditions must be in place for value creation through exchange and combination of resources to be possible: (1) opportunity must exist, (2) opportunity must be recognized, and (3) there must be motivation

for realizing the opportunity. We argue that complementarities between the corporate investor and the portfolio company are likely to be highly related to these conditions. Complementarities in resources between small and large firms often create an opportunity for value creation through combining complementary resources (Rothwell, 1983). The existence of material reciprocal benefits from collaboration should also create incentives for collaboration.

While it has been recognized in earlier research that social capital is beneficial and can provide access to resources and knowledge, it is not fully understood how social capital is created. Social interaction has been found to facilitate knowledge transfer (Tsai & Ghoshal, 1998; Yli-Renko et al., 2001) but more understanding is needed to explain what causes social interaction in interorganizational relationships. In this study, we argue that the expected economic benefits from collaboration are an important factor determining the willingness of corporate investors to devote scarce time for start-up management and to engage in social interaction. Because strategic benefits are typically the main objective for corporations in making CVC investments (Kann, 2000; Keil, 2002; Siegel, Siegel, & MacMillan, 1988; Sykes, 1990; Winters & Murfin, 1988), the potential for strategic benefits should be the prime determinant of economic decisions. Complementarities both in resources and product markets are key precursors to strategic benefits. Therefore, complementarities should be positively related to strategic benefits thereby creating economic incentives to engage in social interaction.

The resource-based and the knowledge-based views regard complementarities in resources and capabilities as the primary reason for firms entering into interorganizational relationships (Chung et al., 2000; Das & Teng, 2000; Hitt, Dacin, Levitas, Arregle, & Borza, 2000). Teece (1986) argued that firms in high-growth industries have to form alliances with partners with complementary capabilities to ensure timely product introduction and to marshal a full array of the required capabilities for commercial success. The role of complementarities has been found to influence both the formation of interorganizational relationships (Chung et al., 2000; Gulati, 1995; Hitt et al., 2000) and their performance (Sarkar, Echambadi, Cavusgil, & Aulakh, 2001). While resource-based and knowledge-based views emphasize the attention corporations pay to the potential resource combination and learning benefits in CVC activities, agency theory and game theory highlight the risk of potential under-investment in the relationship in cases where there are no economic incentives for the corporation to invest in the relationship. Synthesizing these arguments leads to the hypothesis that complementarities create incentives for collaboration and social interaction.

Hypothesis 4. The greater the complementarities between the corporate investor and the portfolio company, the more intense will be the social interaction between the two firms.

Complementarities influencing resource acquisition. Combination of complementary resources is a significant potential source of interorganizational competitive advantage (Dyer & Singh, 1998). The previous section argued that complementary resources are one of the primary reasons for firms to enter interorganizational relationships. Central to this argument is the idea that complementarities create the potential for value creation through combination of the complementary resources. After forming a relationship with a partner possessing some complementary resources, it is likely that some of the complementary resources will be combined to mutual benefit (Larsson & Finkelstein, 1999).

Hypothesis 5a. The greater the complementarities between the corporate investor and the portfolio company, the greater the acquisition of production-related resources.

Hypothesis 5b. The greater the complementarities between the corporate investor and the portfolio company, the greater the acquisition of distribution-related resources.

Social interaction influencing resource acquisition. Although, complementarities between the young venture and the corporate investor are argued to create potential for value creation through combination of complementary resources and that potential is likely to be exploited in these relationships, we still lack understanding as to what facilitates the realization of the potential. We argue that social capital, particularly social interaction, plays a key role in the realization of the potential benefits from complementarities between the two companies. Similarly, as Larsson and Finkelstein (1999) argued in their research on synergy realization in acquisitions, we argue that the existence of complementary resources is not enough for fully realizing the potential benefits. Social interaction between the parties is required to fully realize the potential benefits from complementarities. Social interaction facilitates the exchange of information and other resources and assists in the identification of opportunities for cooperation (Cohen & Levinthal, 1990; Dyer & Singh, 1998; Lane & Lubatkin, 1998; Nahapiet & Ghoshal, 1998; Starr & Macmillan, 1990; Zahra et al., 2000). Examining entrepreneur-venture capitalist relationships from the Prisoner's Dilemma perspective, Cable and Shane (1997) argued that the probability of cooperative entrepreneur-venture capitalist relationships increase with the quality and

frequency of their communications. We predict a similar effect in corporate investor–portfolio firm relationships because of the opportunities for value adding knowledge combinations and strategic complementarities (Hellmann, 2002; Maula & Murray, 2002).

Hypothesis 6a. The greater the social interaction between the corporate investor and the portfolio company, the greater the acquisition of production-related resources.

Hypothesis 6b. The greater the social interaction between the corporate investor and the portfolio company, the greater the acquisition of distribution-related resources.

Social interaction influencing knowledge acquisition. Previously, we argued that corporations are likely to possess knowledge of markets, technology, and competition that would be useful for their portfolio companies. However, the mere existence of complementary knowledge is not enough for the realization of the potential learning benefits. The extent to which a technology-based new firm can acquire external knowledge from its CVC investors will depend on the existence of external knowledge, on the ability of the firm to recognize and assess the value of the knowledge, and on the willingness of the dyad firms to share information. The second and third conditions are both assisted by social interaction. (Cohen & Levinthal, 1990; Dyer & Singh, 1998; Lane & Lubatkin, 1998). We follow Nahapiet and Ghoshal (1998) in arguing that social capital facilitates knowledge acquisition by affecting the conditions necessary for the exchange and combination of existing intellectual resources. Lane and Lubatkin (1998) have pointed out that dyadic learning relationships involve a pattern of interactions that affects the learning of both members of the dyad. In this study, we focus on one specific dimension of social capital, i.e. social interaction, which has been found to be an important facilitator of knowledge transfer (Bresman, Birkinshaw, & Nobel, 1999; Tsai & Ghoshal, 1998; Yli-Renko et al., 2001). Social interaction facilitates the exchange of information and assists in the identification of opportunities for cooperation (Dyer & Singh, 1998; Lane & Lubatkin, 1998; Zahra et al., 2000).

Hypothesis 7. The greater the level of social interaction between the corporate investor and the portfolio company, the greater will be the level of knowledge acquisition by the portfolio company from the corporate investor.

Social interaction mediating complementarities to knowledge acquisition. As noted, the existence of complementary knowledge creates a learning opportunity but it does not yet make the learning happen. Therefore, we further hypothesize that social interaction will mediate the effect of the initial conditions, i.e. the existence of complementarities on the subsequent knowledge acquisition.

Hypothesis 8. Social interaction mediates the positive relationship between complementarities and knowledge acquisition.

Resource acquisition influencing knowledge acquisition. Strong ties have been argued to facilitate the transfer of tacit knowledge (Bresman et al., 1999; Dhanaraj, Lyles, Steensma, & Tihanyi, 2004; Kogut & Zander, 1992; Mowery, Oxley, & Silverman, 1996). If a start-up company has access to some concrete resources from the parent company of the CVC investor in addition to the investment relationship, it is likely that the company also learns more from the corporation when using these resources. The corporation, as an investor, has a direct interest in seeing its valuable resources are optimally used by the recipient portfolio firm. Therefore:

Hypothesis 9a. The greater the acquisition of production-related resources from the corporate investor, the greater the knowledge acquisition from the corporate investor by the portfolio company.

Hypothesis 9b. The greater the acquisition of distribution-related resources from the corporate investor, the greater the knowledge acquisition from the corporate investor by the portfolio company.

Prominence of the corporate investor influencing endorsement. Several studies have identified the status of the exchange partners of the focal firm driving the legitimacy-enhancing endorsement benefits (Podolny, 1993, 1994; Stuart, 2000; Stuart et al., 1999). We identify five reasons why we argue that the prominence of the investor partner is important also in CVC. First, more prominent organizations have higher *reputational risks* and will seek to avoid questionable partners. The existence of risks increases the public value of the endorsement (Carter & Manaster, 1990; Stuart et al., 1999). Second, prominent corporate investors have better *deal flow* and can therefore be more selective (Stuart et al., 1999). Third, prominent corporate investors have better *quality assessment capability* thus increasing the signaling effects of their investments (Stuart et al., 1999). Fourth, associations with more prominent partners lead to more *publicity* (Stuart, 2000; Stuart et al., 1999). Fifth, *the cost of creating a relationship* with a prominent

corporate investor is higher than establishing a relationship with a less prominent corporate investor (Seppä & Maula, 2002). Summing up the previous five arguments, we hypothesize that the prominence of the corporate investor is positively related to the endorsement benefits.

Hypothesis 10. The greater the prominence of the investor, the stronger the endorsement benefit resulting from the association with the corporate investor.

Resource acquisition influencing endorsement. Building on extant research (Kelley & Spinelli, 2001; Stuart et al., 1999), we argue that the strength of the tie between the venture and the corporate investor is likely to influence the endorsement benefits. More specifically, we hypothesize that the level of resource acquisition by the venture from the corporate investor will be positively associated with the endorsement benefits. We identify two reasons for this relationship. First, relationship where the venture accesses concrete resources of the parent corporation increases the *visibility of the relationship*. Kelley and Spinelli (2001) found that portfolio firms with business relationships with their CVC investors formed higher number of alliances with other firms. Second, relationships involving resource acquisition require stronger commitment from the corporate partner and thus are *more credible signals*. The stronger the ties, the greater their external credibility. Therefore, development of the investor relationship to include sharing of concrete resources should result in higher endorsement benefits compared to firms sharing only a financial relationship. Summarizing the arguments, resource acquisition by ventures from their corporate investors is likely to create increased attention and be viewed publicly as a more serious signal of the quality or potential of the venture than that suggested by an exclusively financial transfer.

Hypothesis 11a. The greater the acquisition of production-related resources, the greater the endorsement benefit resulting from the association with a corporate investor.

Hypothesis 11b. The greater the acquisition of distribution-related resources, the greater the endorsement benefit resulting from the association with a corporate investor.

We also hypothesize that complementarities are valuable for endorsement but that the effect is mediated by resource acquisition. We argue that complementarities influence the quality assessment and goal alignment judgments of the corporate investor but suggest that these factors gain more weight when accompanied by resource acquisition. First, we argue that

complementarities influence the *quality assessment capability* of the corporate investor. As discussed in the context of Hypothesis 10, the expected quality assessment capability of the partner influences the endorsement benefits of the focal actor (Stuart et al., 1999). The greater the complementarities between the corporate investor and the focal venture, the more informed the corporate investor can be assumed to be in evaluating the quality of the venture. As noted, this suggests a positive relationship between complementarities and endorsement benefits. Second, complementarities are likely to be positively related to *goal alignment with the corporate investor*. As suggested by Stuart et al. (1999), the alignment of objectives between the partners is likely to have an impact on the endorsement benefits. For instance, the theoretical work of Hellmann (2002) on CVC relationships suggests that the complementarity (versus cannibalism) influences the venture's sensibility regarding the attraction of CVC investors. We hypothesize that the greater the complementarities between the partner and the focal venture, the higher the likely benefits to the venture from the relationship. In turn, the higher the expected benefits, the greater the expected performance of the focal venture. However, while complementarities are argued to be positively related to endorsement benefits, we also argue that resource acquisition positively mediates this relationship. The purpose of resource acquisition is to allow the realization of the potential benefits stemming from the complementarities by making the consequences visible to outsiders. Summarizing the above arguments, complementarities are posited to increase the quality assessment capability and goal alignment effects on the corporate venturer, thus improving the external or public value of the endorsement. It is suggested that these benefits are mediated by resource acquisition. Therefore:

Hypothesis 12a. Acquisition of production-related resources mediates the positive relationship between complementarities and endorsement.

Hypothesis 12b. Acquisition of production-related resources mediates the positive relationship between complementarities and endorsement.

Venture age influencing endorsement. We argue that characteristics of the focal venture, especially uncertainty, are likely to influence the value of the endorsement benefits. This argument is well grounded in the asymmetric information theory (Akerlof, 1970) and signaling theory (Spence, 1973) as well as the endorsement arguments of Podolny (1993, 1994) and Stuart et al. (1999) and Stuart (2000). The role of uncertainty, commonly proxied with venture age, on signaling effects has been demonstrated in research on asymmetric information. Similarly, research from sociological perspectives

examining legitimizing endorsement benefits has similarly focused on the uncertainty measured as the age of the venture (Stuart, 2000; Stuart et al., 1999). Thus, the age of the focal venture is identified as a key factor influencing the endorsement benefits. The younger the venture, the higher the uncertainty regarding the true quality of the focal venture. In consequence, the more weight will be given to the role of venture's affiliates when determining its quality.

Hypothesis 13. The younger the venture, the stronger the endorsement benefit resulting from the association with a corporate investor.

Customer switching costs influencing endorsement. Transaction cost economics highlight one further important aspect influencing the value of endorsements: the magnitude of risk related to the exchange relationship. In addition to uncertainty and opportunism, transaction cost economics highlight the importance of the stakes that would be at risk in transactions as a factor driving the need for safeguarding the transactions. According to transaction cost economics, asset specificity is an important factor influencing (i.e. increasing) the risk in an exchange relationship (Williamson, 1975, 1985). Switching costs related to changing a supplier or a partner influence the need to safeguard transactions. Transaction cost economics posit that when asset specificity and switching costs are high, there is a high need for safeguards against opportunism and uncertainty in exchange relationships. Considering prominent partners as certifiers against opportunism and other risks, the value of interorganizational endorsements is likely to be higher when there are high transaction costs between the start-up company and its potential customers and partners (Swaminathan et al., 2001). Therefore, we argue that the higher the risk a potential partner or customer has to assume in forming a business relationship with the focal venture, the more it will give weight to all signals of the quality, including endorsement. As a specific form of risk for customers and partners, we recognize high switching costs increasing the risk in selecting a partner, supplier or employer of uncertain quality. Because the long-term success of a venture is largely determined by the willingness of the potential customers to adopt the products of the venture, potential partners and employees will similarly be interested in the likelihood of potential customers to adopt the products. Therefore, high customer switching costs are likely to increase the value of endorsement not only in attracting potential customers, but also in attracting potential partners and employees. Supporting these arguments, Singh (1997) demonstrated that technological complexity of products moderated the influence of interorganizational alliances on the likelihood

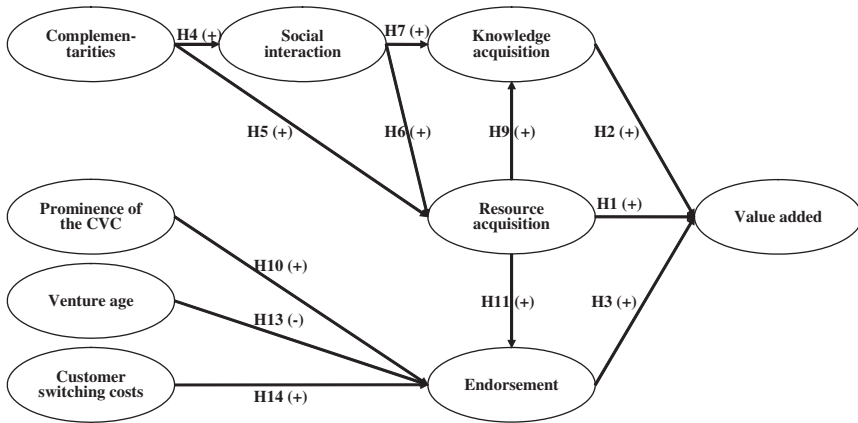


Fig. 1. Hypothesized Integrated Model.

of survival of firms in hospital software systems industry. Similarly, Swaminathan et al. (2001) demonstrated that suppliers of architectural goods (high switching costs) benefit more from high-status customers than suppliers of modular goods (low switching costs).

Hypothesis 14. The greater the customer switching costs, the stronger the focal venture’s endorsement benefit resulting from the association with a corporate investor.

The hypothesized model is presented in Fig. 1.

METHODS

Sample

The hypotheses were tested using data from a survey administered to CEOs and founders of CVC financed, U.S. technology-based new firms in December 2000. CVC-backed companies were identified from the Venture Economics database. A technology-based new firm was defined as a firm less than 6 years old (Robinson & McDougall, 2001; Shrader, 2001; Zahra et al., 2000) and operating in one of the following sectors: biotechnology, medical/health science, internet specific, communications, computer software and services, computer hardware, or semiconductors/other electronics. We also required that the venture receive funding from at least one independent

venture capitalist. Companies that had been acquired, had gone public, or had subsequently ceased operation were excluded. A further sampling condition was that the most recent investment in the portfolio company had been made within the last two years in order to ensure that the relationship was still active. Finally, we excluded ventures that were found to be originally spin-offs from the corporation currently acting as a corporate investor. This exclusion was made in order to limit the research to the perspectives of new and independent ventures that had accepted CVC financing from organization with which they had no previous association.

The sampling frame consisted of the entire population of 810 privately held technology-based new firms fulfilling the selection criteria at the time of the survey (November 2000–January 2001). Of the 135 questionnaires received, 91 met all sample selection criteria and were sufficiently complete. This translates to a response rate of 17%, which can be considered acceptable given that it was requested that the four-page questionnaires be completed by CEOs. In this population, the average age of the firms was just over 3 years, with an average of \$55 million external investment. With average revenues of less than \$5 million per year, the CEOs of these companies were likely to be under very strong investor pressure to grow their business rapidly.

Non-response bias was analyzed by comparing the age, geographic location, and industry sectors between the respondent and the non-respondent firms. We conducted further response bias analysis by comparing statistically the number of employees and the revenues of early and late respondents. For all tests, no significant biases were detected.

Several methods were used to ensure the validity and reliability of the data. First, we pre-tested the four-page survey instrument with several CEOs and CVC investors. In the instrument, previously validated constructs and measurement items were used whenever possible. Multi-item constructs were used for most latent variables in order to reduce measurement error. All of our multi-item constructs achieved construct reliabilities of 0.80 or higher, thus indicating good internal consistency. Because there were no close proxies or external measures available for many of the critical variables examined, we had to rely on the self-reported assessment of surveyed CEOs on these variables. To ensure validity, we used previously validated measures whenever possible. We also examined the possibility of common method variance using Harman's single factor test (Podsakoff & Organ, 1986). This analysis suggested that common method variance was not a serious threat for the validity of this study. Further evidence on reliability and validity is discussed below.

Statistical Methods

In testing our hypotheses, the study employed four main statistical methods. First, confirmatory factor analysis was employed in testing the validity of the constructs. Second, multiple regression analysis was used in testing the paths between constructs. Third, an application of the multiple regression analysis was used to test the mediation effects. Fourth, structural equation modeling was employed to test simultaneously the paths in the model. Because of the lack of space and similar results both in hierarchical regressions and structural equation modeling, only the results of the structural equation modeling are reported here.

Construct Operationalizations

Whenever an objective measure was not available, constructs were operationalized as multi-item scales. Whenever possible these constructs and their measurement items were derived from prior research. All statement-style items were measured on a scale from 1 (strongly disagree) to 7 (strongly agree). Confirmatory factor analysis and Cronbach's alpha tests were used to test the unidimensionality and inter-item reliability of the measures. Summated scales were used in path modeling.

Value-added. There is little research examining the value-added provided by corporate venture capitalists for their portfolio companies. In two prior studies known to us, Gompers and Lerner (1998) and Maula and Murray (2002) examined the impact of the existence of specific types of corporate venture capitalists on the probability of making an initial public offering and the market valuation at the initial public offering, respectively. However, the purpose of the present study is to create a deeper understanding of how these investors add value. In other words, what are the key value-adding mechanisms and what factors influencing them. Creating this understanding using secondary data would be difficult because of the lack of suitable data and measures for many of the important constructs (Das & Teng, 2000). Therefore, our research strategy was to rely on primary data collected from key informants, CEOs of technology-based new firms.

In our model the main dependent variable is the value-added received from the most important CVC investor of the ventures as perceived by the CEOs of those ventures. Given the focus of the study on the value-added received by a ventures from one of their many interorganizational relationships, there are not many good alternatives for measuring the value of the relationship other than asking the persons most knowledgeable of them,

usually the CEOs of the ventures. The use of survey-based measures has recently been warranted (Das & Teng, 2000). Perceptual measures have been argued to be well-suited to the measurement of the performance and value creation in interorganizational relationships and the reliability of perceptual measures has been shown to be good in many of the studies examining analogous situations such as performance of strategic alliances (Bucklin & Sengupta, 1993; Saxton, 1997; Weaver & Dickson, 1998), joint ventures (Geringer & Herbert, 1991), and performance in vertical supplier–customer relationships (Anderson & Narus, 1990; Mohr & Spekman, 1994; Yli-Renko et al., 2001). The use of perceptual measures is based on the notion that success is, in part, subjective and is determined by how well the partnership achieves the performance expectations set by the partners (Anderson & Narus, 1990; Mohr & Speckman, 1994; Saxton, 1997; Weaver & Dickson, 1998). Furthermore, the performance of the relationship between a CVC investor and a technology-based new venture would be hard to infer from the overall performance of the venture which is influenced not only by the value added from the largest CVC investor but also from a host of other interorganizational relationships as well as a large number of other known determinants of venture success.

Following the traditions in research on the performance implications of interorganizational relationships, we determine the overall value-added using a multi-item scale measuring the overall satisfaction of the key informants. The value-added construct measures the non-financial contribution provided by the CVC investors as perceived by the start-up CEOs. The construct was operationalized using three measurement items. The factor loadings are all above 0.83. The Cronbach's alpha for this construct is 0.87.

Value-adding mechanisms. The confirmatory factor analysis was conducted simultaneously for all the value-added mechanisms. The factor analysis identified the correct number of factors with lambdas above one. The included measurement items loaded higher than 0.60 in the primary factor and lower than or equal to 0.40 on any other factor except for two measurement items. These two measurement items were measures of the acquisition of production-related resources and loaded above 0.40 on the distribution type resource acquisition construct (0.43 and 0.48). The results of the factor analyses are presented in Table 1.

Resource acquisition refers to the concrete resources the start-up company has acquired or gained access to through the investment relationship. Resource acquisition is divided into resources related to production and technology and resources related to marketing and distribution of the products.

Table 1. Factor Analysis.

<i>Value-Added</i>	Loadings			
This investor has provided us valuable value-adding support in addition to the financing				0.93
The value adding support provided by this investor has been critical for our success				0.91
We are very happy about having this investor				0.83
	Loadings factor 1	Loadings factor 2	Loadings factor 3	Loadings factor 4
<i>Resource acquisition (Production)</i>				
This corporate investor has been valuable ...				
... in opening access to their production facilities	0.62	0.48	0.23	0.09
... in letting us use their technology	0.87	0.07	0.18	0.17
... in opening access to their R&D	0.84	-0.06	0.28	0.14
... in helping us acquire their products/services at a lower cost	0.74	0.43	-0.01	0.18
<i>Resource acquisition (Distribution)</i>				
This corporate investor has been valuable ...				
... in opening access to sell to their customers	0.17	0.72	0.32	0.33
... in opening access to their distribution channels	0.14	0.88	0.22	0.19
<i>Knowledge acquisition</i>				
From this investor, we have obtained valuable ...				
... market knowledge	0.08	0.14	0.87	0.19
... information on competition	0.20	0.15	0.79	0.09
This investor has been an important source of information/know how for us on ...				
... customer needs and trends	0.16	0.07	0.84	0.17
... competition in our field	0.07	0.20	0.85	0.14
We have learnt or acquired some new or important information from this investor	0.24	0.16	0.73	0.30

Table 1 (Continued)

	Loadings factor 1	Loadings factor 2	Loadings factor 3	Loadings factor 4
<i>Endorsement</i>				
We have actively used the name of this investor in order to be more credible when ...				
... raising money from other investors	0.10	0.10	0.10	0.74
... recruiting new employees	-0.02	0.13	0.20	0.88
... trying to attract new partners/suppliers	0.30	0.18	0.22	0.80
... trying to attract new domestic customers	0.25	0.20	0.23	0.79
				Loadings
<i>Complementarities</i>				
Our products/services ...				
... facilitate the use of the products/services for our largest corporate investor				0.80
... complete a solution set that the customers of our largest corporate investor are demanding				0.79
... are highly complementary with the products/services of our largest corporate investor				0.87
Increase in the demand for our products/services increases the demand for the corporate investor's products/services				0.75
Our capabilities/skills are highly complementary with the capabilities/skills of our largest corporate investor				0.87
We have superior capabilities/skills in some areas compared to our largest corporate investor				0.70
<i>Social interaction</i>				
How often you are in contact with this investor? (Seven-point scale from "every day" to "less often than once a quarter")				0.68
We know this investor's people on a personal level				0.84
We maintain close social relationships with this investor				0.90
We often meet this investor's people informally				0.89
<i>Customer switching costs</i>				
Buying our products/services is a major decision for our customers				0.90
Our products/services are very important for the customers				0.80
It is expensive for customers to switch to or from using our products/services				0.63
Face-to-face discussions with customers are important when selling our product/service				0.80

Note: Principal component analysis, varimax-rotated whenever more than one factor.

Resource acquisition (production). The measurement items covered resources including production facilities, technology, R&D, and the possibility of acquiring products or services at a lower cost. All items loaded on the factor with factor loadings higher than 0.62 suggesting a good convergent validity. The inter-item reliability for this construct is 0.86.

Resource acquisition (distribution). The measurement items covered resources such as distribution channels. The measurement items and factor loadings are presented in Table 1. All items loaded on the correct factor with factor loadings higher than 0.72 suggesting a good convergent validity. The inter-item reliability coefficient for this construct is 0.83.

Knowledge acquisition. In contrast to resource acquisition, which refers to accessing concrete resources of the corporate investor through the investor relationship, knowledge acquisition refers to the learning benefits realized in the investor relationship. For example, start-up companies may learn from their corporate investor about markets, customer needs, competition, and/or technological issues. The knowledge acquisition construct was defined using five indicators. The items were adopted from Yli-Renko et al. (2001) and Kale, Singh, and Perlmutter (2000) and modified slightly to fit the context of the present study. The knowledge acquisition construct is in line with Huber's (1991) 'grafting' process of organizational learning. The measures of the knowledge acquisition construct cover acquisition of knowledge on market trends, customer needs, and competition. All items loaded on the factor with factor loadings higher than 0.73 suggesting a good convergent validity. The Cronbach's alpha inter-item reliability coefficient for this construct is 0.91.

Endorsement refers to the value the association with a large corporation brings in the form of increased legitimacy when attracting new investors, employees, partners, and customers. Endorsement was operationalized using four items measuring the reputational benefits the start-up company has received from its association with the investor. Endorsement benefits were operationalized using four measurement items. All the measurement items loaded on the correct factor and had factor loadings of 0.74 or higher. The Cronbach's alpha inter-item reliability coefficient for this construct is 0.88.

Complementarities. Literature espousing the resource-based view stresses the strategic importance of exploiting complementarities in resources and capabilities. In addition to resources and capabilities, complementarities can also stem from the product or service offerings of two companies (Amit & Zott, 2001; Brandenburger & Nalebuff, 1996). Amit and Zott (2001) argued that complementarities are present whenever having a bundle of goods together provides more value than the total value of having each of the goods

separately. Similarly, [Brandenburger and Nalebuff \(1996\)](#) stated that, “a player is your complementor if customers value your product more when they also have the other player’s product than when they have your product alone”. Complementors are players from whom customers buy complementary products or to whom suppliers sell complementary resources ([Brandenburger & Nalebuff, 1996](#)). In the present study, complementarities both in resources and capabilities as well as in the products and services offered to customers are included. The construct was defined using six indicators. The measurement items and factor loadings are presented in [Table 1](#). Only one factor with lambda over 1.0 emerged in the factor analysis indicating good construct validity. The factor loadings were all above 0.70 for this construct. The Cronbach’s alpha inter-item reliability coefficient for this construct is 0.88.

Social interaction was defined using four indicators. The first item, frequency of interaction, was adopted from [Sapienza \(1992\)](#) and [Sapienza and Gupta \(1994\)](#). The three other items (knowledge of investor’s people on personal level, closeness of the relationship, and informal meetings) have earlier been used by [Tsai and Ghoshal \(1998\)](#) and [Yli-Renko et al. \(2001\)](#) in measuring social interaction in organizational relationships building on [Nahapiet and Ghoshal \(1998\)](#). The factor loadings were all above 0.68 in this construct. The Cronbach’s alpha inter-item reliability coefficient for this construct is 0.85.

Corporate investor prominence. Investor prominence is operationalized as the economic size of the corporate investor. The size of the parent corporation is considered to be a proxy of the influence the parent corporation has in the industry in which it operates ([Mitchell & Singh, 1992](#); [Stuart, 2000](#)). In some research, other operationalizations of partner prominence have also been used. For instance, some earlier studies have used Fortune Magazine reputation measures (e.g. [Saxton, 1997](#)). However, researchers have later discouraged their use because of lack of underlying theory ([Deephouse, 2000](#)). Some other alternative measures have included market share. However, market share data are hard to come by and are not suitable for multi-industry studies. In the present study, a further difficulty stems from the fact that some of the corporate investors are global or non-US registered, which makes it difficult to gather comparable figures for more fine-grained measures than revenues. There is a long tradition using corporate revenues as a measure of prominence and industry strength ([Mitchell & Singh, 1992](#); [Stuart, 2000](#)). For the purposes of the present study, revenue of the parent corporation was seen as the best measure of the prominence

and industry strength. Revenues were available for all corporations. Following Mitchell and Singh (1992), the logarithm of total corporate sales was used.

Venture age was measured in years since inception. Following prior research, we used the age of the company as a proxy for uncertainty according to the asymmetric information literature (e.g. Stuart, 2000). The younger the company is, the more uncertain are the prospects of the company. In empirical studies examining the impact of asymmetric information and endorsement on the initial returns, age has been found to be negatively correlated with gross spreads and initial returns. This measure is also in line with the social capital literature definition of *liability of newness* (Aldrich & Auster, 1986; Stinchcombe, 1965). Age has been used in several analogous studies of endorsement as a proxy for uncertainty (Stuart, 2000; Stuart et al., 1999).

Customer-switching costs. The nature of the business has been argued to be an important determinant of the ease for potential customers to source the product from an alternative supplier. The idea advocated in the present study is that the higher the switching costs and the importance of the product, the higher the risks for potential customers to select a technology-based new firm as a supplier, and in consequence the more difficult it is for these young ventures to attract partners and customers. Endorsement by prominent corporations is seen as a mechanism that encourages potential customers and partners to accept the risks. Swaminathan et al. (2001) examined the U.S. automotive industry between 1918 and 1942 and found that suppliers of architectural goods (higher switching costs) benefited more from high-status customers than suppliers of modular goods (lower switching costs). In the present study, customer-switching costs were defined using four indicators. The factor loadings were all above 0.63 for this construct. The inter-item reliability coefficient for this construct is 0.77.

Venture size was measured as the number of employees at the end of 2000 according to the information provided by the respondents. Number of employees was used instead of revenues because many of the young (mean age 2.93 years) firms did not have revenues. The logarithm of the number of employees was used in the hierarchical regression analyses.

Venture industry sector. Industry effects were controlled in the multiple regression analyses by including dummy variables in the analyses. Because of the limited sample size, these were included in the hierarchical regression analyses but not in the structural equation model given that they were not found to influence the results.

RESULTS

The descriptive statistics and correlations are presented in Table 2.

Model Fit

As Table 3 demonstrates, the overall fit of the hypothesized model is good. The Chi-square test indicates a non-significant difference between the hypothesized and observed covariance matrices ($p \geq 0.10$), thus suggesting a good fit of the model. The Normed Chi-square statistic for the hypothesized model is 1.38, well within the recommended range 1.0–2.0 (Hair, Anderson, Tatham, & Black, 1998). Values close to or above 0.90 on the goodness-of-fit index and non-normed fit index are desirable. The hypothesized model exceeds these limits. The comparative fit index value 0.970 exceeds the new strict criteria of 0.950 thus indicating a good fit (Hu & Bentler, 1999). Also the root mean square error of approximation was within the recommended limits for acceptable fit of 0.08 (Browne & Cudeck, 1993; MacCallum et al. 1996). Overall, the hypothesized model appears to fit well.

We also examined the model fit on the parameter estimate level (Byrne, 2001). No correlations above 1.00 or negative variances were found. The covariance matrix was also positive definite (Byrne, 2001). Standard errors were also reasonable and the direction and significance of the parameters were in accordance with the underlying theory and hypotheses in 16 out of 17 hypothesized parameters also suggesting good fit of the model. The parameter estimates are discussed further in later sections.

Nested model tests (Loehlin, 1987) were employed to assess the fit of the hypothesized model and to test its robustness by comparing it to other alternative models. Nested model tests are a means of internally validating a hypothesized model by comparing the Chi-squares of models that differ in the number of paths hypothesized. Nested models can be derived from each other by adding or deleting paths. A significant difference in Chi-square indicates that the more complex model provides a better fit with the data (Steiger, Shapiro, & Browne, 1985). We compared models 1 through 4 in Table 3 by using sequential Chi-square difference tests to obtain successive fit assessments (Steiger et al., 1985). Following a series of hierarchical tests, the validity of the hypothesized model was tested by showing that it is the best fitting of the theoretically meaningful models. The four nested models compared in the analysis are: (1) a null model, in which no relationships are posited; (2) the hypothesized model; (3) a partial mediation model in which a direct path is added to the hypothesized model between complementarities

Table 2. Descriptive Statistics and Correlations.

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Value-added	4.67	1.66	—																
2. Resource acquisition (production)	3.08	1.66	0.52	—															
3. Resource acquisition (distribution)	3.56	1.89	0.47	0.49	—														
4. Knowledge acquisition	4.30	1.63	0.70	0.42	0.49	—													
5. Endorsement	5.32	1.41	0.54	0.43	0.49	0.47	—												
6. Social interaction	4.09	1.76	0.61	0.42	0.55	0.55	0.46	—											
7. Venture-corporate investor complementarities	4.94	1.64	0.33	0.33	0.48	0.31	0.40	0.42	—										
8. Corporate investor prominence	8.96	2.06	0.16	-0.01	-0.04	0.00	0.21	0.03	-0.12	—									
9. Customer switching costs	5.52	1.24	0.25	0.10	0.22	0.25	0.39	0.17	0.40	0.02	—								
10. Venture age	2.93	1.33	-0.14	-0.15	-0.11	-0.22	-0.16	-0.24	-0.12	-0.03	0.13	—							
11. Venture size (employees)	4.46	0.78	0.06	-0.06	0.19	0.06	0.17	0.03	0.04	-0.01	0.06	0.00	—						
12. Biotechnology	0.02	0.15	0.17	0.14	0.00	0.04	-0.07	0.14	0.10	-0.15	0.04	0.02	-0.04	—					
13. Medical/Health	0.04	0.21	-0.02	-0.05	-0.08	0.10	-0.18	-0.12	-0.21	-0.02	-0.03	0.21	-0.32	-0.03	—				
14. Internet Specific	0.49	0.50	-0.19	-0.06	0.21	-0.22	-0.12	-0.07	-0.01	-0.18	-0.29	-0.16	0.17	-0.15	-0.21	—			
15. Communications	0.12	0.33	-0.06	-0.06	-0.17	0.02	0.05	0.08	0.13	0.09	0.21	-0.09	0.11	-0.06	-0.08	-0.37	—		
16. Computer Software and Services	0.18	0.38	0.12	0.13	0.06	0.07	0.20	0.01	-0.06	0.07	0.02	0.10	0.02	-0.07	-0.10	-0.46	-0.17	—	
17. Computer Hardware	0.03	0.18	-0.06	-0.07	0.11	-0.10	0.03	-0.02	0.03	0.13	0.15	0.07	0.08	-0.03	-0.04	-0.18	-0.07	-0.09	—
18. Semiconductors/Other Elect.	0.11	0.31	0.19	0.01	-0.24	0.22	0.02	0.04	0.02	0.11	0.13	0.04	-0.23	-0.05	-0.08	-0.35	-0.13	-0.16	-0.06

Table 3. Goodness of Fit Statistics for the Structural Equation Models.

Model	χ^2	<i>df</i>	<i>p</i>	Normed χ^2	GFI	NNFI	CFI	AIC	RMSEA
1. Null model	312.91	45	0.000	6.95	0.469	0.000	0.000	332.91	0.257
2. Hypothesized model	29.05	21	0.113	1.38	0.944	0.936	0.970	97.05	0.065
3. Partial mediation model 1 (Direct path added between complementarities and knowledge acquisition)	29.03	20	0.087	1.45	0.944	0.924	0.966	99.03	0.071
4. Partial mediation model 2 (Direct path added between complementarities and endorsement)	27.86	20	0.113	1.39	0.946	0.934	0.971	97.86	0.066

Note: Normed Chi-square, Chi-square adjusted by degrees of freedom; GFI, Jöreskog and Sörbom's goodness-of-fit index, compares predicted squared residuals with obtained residuals, not adjusted by degrees of freedom; NNFI, Tucker and Lewis' index (non-normed fit index) compares proposed model to null model, adjusted by degrees of freedom; and CFI, compares proposed model to null model, adjusted by degrees of freedom; AIC, Akaike information criterion; RMSEA, Root Mean Square Error of Approximation.

and knowledge acquisition; and (4) a partial mediation model in which a direct path is added to the hypothesized model between complementarities and endorsement. Table 4 summarizes the testing sequence employed.

In the testing sequence, the first comparison is the comparison between the hypothesized model and the null model. The goodness-of-fit statistics (Table 3) and the Chi-square difference test (Table 4) indicate that the hypothesized model provides a better fit than the null model. The second comparison is a robustness test, which evaluated the strength of the effect of social interaction mediating the complementarity effects to knowledge acquisition. In this comparison, the hypothesized model was compared to the partial mediation model in which a direct path was added to the hypothesized model between complementarities and knowledge acquisition. The difference in Chi-square is not significant (second row in Table 4), indicating that the more parsimonious, hypothesized model provides a better fit with the data than the partial mediation model. The third comparison is a robustness test testing the strength of the effect of resource acquisition mediating the complementarity effects to endorsement. In this comparison, the hypothesized model was compared to the partial mediation model in which a direct path was added to the hypothesized model between complementarities and endorsement. The difference in Chi-square is not significant (third row in Table 4), again indicating that the more parsimonious, hypothesized model provides a better fit with the data than the partial mediation model. Having tested all the relevant model alternatives, we conclude that the hypothesized model (Model 2) provides the best fit and terminate the testing. Fig. 2 presents the diagram of the hypothesized model tested using structural equation modeling.

Hypothesis Testing

Testing the fit of the hypothesized model and finding no signs of misspecification allowed testing the hypotheses. Table 5 presents the standardized maximum likelihood parameter estimates and their statistical significance levels for the hypothesized path model. In the hypothesized model, 17

Table 4. Nested Model Testing Sequence and Difference Tests.

More Parsimonious Model		Less Parsimonious Model	$\Delta\chi^2$	Δdf	p	Preferred
1. Null model	vs.	2. Hypothesized model	283.86	24	<0.005	Model 2
2. Hypothesized model	vs.	3. Partial mediation model 1	0.01	1	>0.100	Model 2
3. Hypothesized model	vs.	4. Partial mediation model 2	1.18	1	>0.100	Model 2

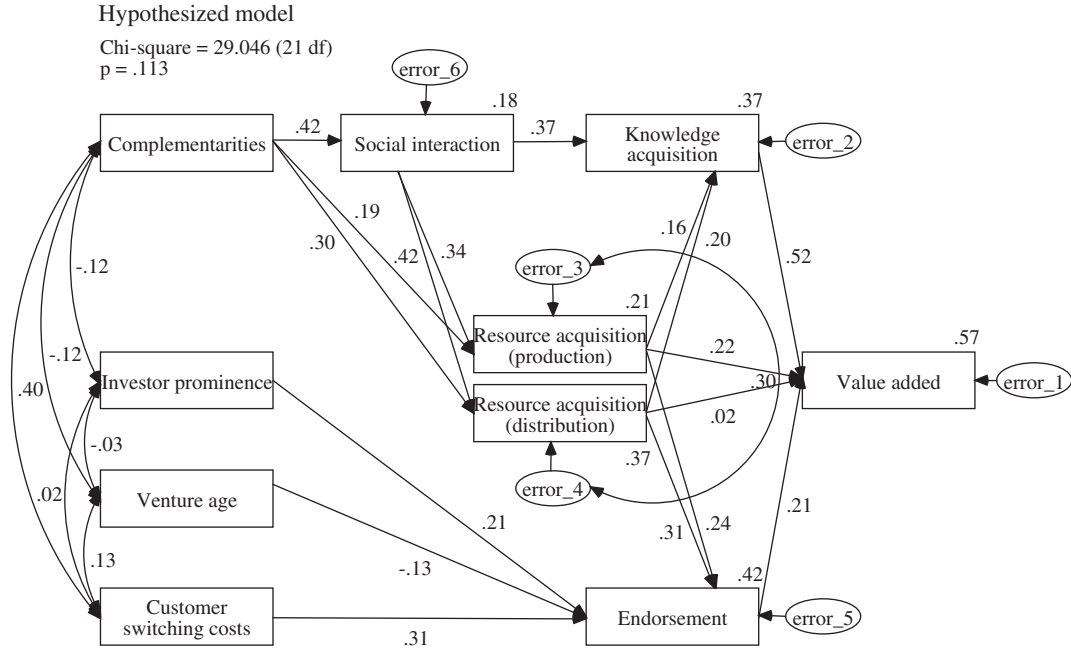


Fig. 2. Structural Equation Modeling Results of the Hypothesized Integrated Model.

Table 5. Structural Equation Modeling Tests of Hypotheses.

Hypothesis	Description of Path		Coefficient	
H1a	Resource acquisition (production)	→ (+) Value-added	0.22**	Supported
H1b	Resource acquisition (distribution)	→ (+) Value-added	0.02	Not supported
H2	Knowledge acquisition	→ (+) Value-added	0.52***	Supported
H3	Endorsement	→ (+) Value-added	0.21**	Supported
H4	Complementarities	→ (+) Social interaction	0.42***	Supported
H5a	Complementarities	→ (+) Resource acquisition (production)	0.19*	Supported
H5b	Complementarities	→ (+) Resource acquisition (distribution)	0.30***	Supported
H6a	Social interaction	→ (+) Resource acquisition (production)	0.34***	Supported
H6b	Social interaction	→ (+) Resource acquisition (distribution)	0.42***	Supported
H7	Social interaction	→ (+) Knowledge acquisition	0.37***	Supported
H9a	Resource acquisition (production)	→ (+) Knowledge acquisition	0.16*	Supported
H9b	Resource acquisition (distribution)	→ (+) Knowledge acquisition	0.20*	Supported
H10	Investor prominence	→ (+) Endorsement	0.21**	Supported
H11b	Resource acquisition (production)	→ (+) Endorsement	0.24**	Supported
H11a	Resource acquisition (distribution)	→ (+) Endorsement	0.31***	Supported
H13	Venture age	→ (-) Endorsement	-0.13 ⁺	Weak support
H14	Customer switching costs	→ (+) Endorsement	0.31***	Supported

*** $p \leq 0.001$;** $p \leq 0.01$;* $p \leq 0.05$;⁺ $p \leq 0.10$, hypothesized paths one-tailed tests.

relationships are tested. Sixteen out of 17 hypotheses received at least weak support from the empirical data.

The first set of hypotheses predicts the mechanisms through which CVC investments may add value to portfolio companies. Hypothesis 1a, which states that acquisition of production-related resources is positively related to value-added, received strong support from the data ($\beta = 0.22, p \leq 0.01$). Hypothesis 1b states that acquisition of distribution-related resources is positively related to value-added. In this data acquisition of distribution-related resources was not significantly related to value-added ($\beta = 0.02, n.s.$). Hypothesis 2 states that knowledge acquisition is positively related to value-added. This hypothesis received strong support from the data ($\beta = 0.52, p \leq 0.001$). Hypothesis 3 states that endorsement is positively related to value-added. This hypothesis also received strong support from the data ($\beta = 0.21, p \leq 0.01$). Overall, all the three main mechanisms of value-added were positively related to the perceived value-added.

The second set of hypotheses concerns the factors affecting resource and knowledge acquisition by portfolio companies from their corporate investors. Hypothesis 4 states that complementarities between the venture and the corporate investor are positively related to social interaction. This hypothesis received strong support from the data ($\beta = 0.42, p \leq 0.001$). Hypothesis 5a, which states that complementarities are positively related to acquisition of production-related resources, received strong support from the data ($\beta = 0.19, p \leq 0.05$). Similarly, Hypothesis 5b stating that complementarities are positively related to acquisition of distribution-related resources received strong support from the data ($\beta = 0.30, p \leq 0.001$). Hypothesis 6a states that social interaction is positively related to acquisition of production-related resources. This hypothesis received strong support from the data ($\beta = 0.34, p \leq 0.001$). Hypothesis 6b states that social interaction is positively related to acquisition of distribution-related resources. Also this hypothesis received strong support from the data ($\beta = 0.42, p \leq 0.001$). Hypothesis 7 states that social interaction is positively related to knowledge acquisition. This hypothesis received strong support from the data ($\beta = 0.37, p \leq 0.001$). Hypothesis 9a states that acquisition of production-related resources is positively related to knowledge acquisition. This hypothesis received strong support from the data ($\beta = 0.16, p \leq 0.05$). Finally, Hypothesis 9b stating that acquisition of distribution-related resources is positively related to knowledge acquisition received strong support ($\beta = 0.20, p \leq 0.05$).

The third set of hypotheses concerns the factors affecting endorsement benefits received by portfolio companies from their association with their

corporate investors. Predicting the role of corporate investor characteristics, Hypothesis 10 states that investor prominence is positively related to endorsement. This hypothesis received strong support from the data ($\beta = 0.21$, $p \leq 0.01$). Predicting that the role of the strength of tie influences the credibility of the endorsement, Hypothesis 11a states that acquisition of production-related resources is positively related to endorsement. This hypothesis received strong support from the data ($\beta = 0.24$, $p \leq 0.01$). Similarly, Hypothesis 11b states that acquisition of distribution-related resources is positively related to endorsement. Again this hypothesis received strong support from the data ($\beta = 0.31$, $p \leq 0.001$). Predicting the role of uncertainty of the quality of the venture influencing the value of the endorsement, Hypothesis 13 states that venture age is negatively related to the endorsement. This hypothesis received weak support from the data ($\beta = -0.13$, $p \leq 0.10$). Predicting the role of customer risks influencing the value of endorsements, Hypothesis 14 states that customer switching costs is positively related to endorsement. This hypothesis received strong support from the data ($\beta = 0.31$, $p \leq 0.001$).

Hypothesis 8 predicts that social interaction mediates the influence of complementarities on knowledge acquisition. We tested this hypothesis by first examining the results of the nested model tests and then analyzing the specific relationships between the constructs. In the nested model tests, the hypothesized mediation model (model 2) provided a better fit than the alternative partial mediation model in which a direct path was added to the hypothesized model between complementarities and knowledge acquisition (model 3). This result provides evidence in support of a significant role for social interaction in mediating the effects of complementarities. To demonstrate mediation in specific relationships, we followed the steps suggested by Baron and Kenny (1986). First, the independent variable (complementarities) was shown to be related to the mediator (social interaction). Second, the mediator was shown to be related to the dependent variable (knowledge acquisition). Third, the relationship between the independent variable (complementarities) and the dependent variable (knowledge acquisition) was shown to be insignificant when the mediator is accounted for. Thus, it appears that social interaction mediates the relationship between complementarities and knowledge acquisition. Similarly, Hypotheses 12a and 12b predict that resource acquisition mediates the influence of complementarities on endorsement. We tested this hypothesis using the same procedure by first examining the results of the nested model tests and thereafter analyzing the specific relationships between the constructs. The results indicate that resource acquisition mediates the relationship between

complementarities and endorsement. The results of our unreported regression analyses using Goodman's mediation test were similar.

DISCUSSION

This paper set out to analyze the relationship between CVC investors and their portfolio companies from the viewpoint of the portfolio company. Based on theory and extant research in related fields, a model and hypotheses were developed focusing on (1) the forms of value-added provided by CVC investors; (2) the factors influencing resource and knowledge acquisition; and (3) the factors influencing the endorsement effects. These hypotheses were tested employing contemporary survey data from technology-based new firm–CVC investor dyads. This model is the first empirically validated, comprehensive model that explains the value-added received by entrepreneurs from the relationships with their CVC investors.

In this study, we found that portfolio companies receive value-added from their corporate investors primarily through three main mechanisms: resource acquisition, knowledge acquisition, and endorsement. *Resource acquisition* refers to concrete resources such as distribution channels and production facilities that the portfolio company can access through the relationship with the corporate investor. *Knowledge acquisition* refers to the organizational learning by the technology-based new firm enabled through interaction with the CVC investor and access to their knowledge base. *Endorsement* refers to the reputational benefits the portfolio company receives from being associated with a corporate investor. These value-added mechanisms were in general shown to be strongly associated with the perceived value-added.

In addition to identifying the key mechanisms through which CVC investors add value to their portfolio companies, the study also identified some of the key factors influencing resource acquisition and knowledge acquisition in relationships between technology-based new firms and their corporate investors. Recognizing organizations as economic actors (although embedded in social context), the economic motivation is an important factor influencing the willingness to collaborate (Amit & Zott, 2001; Brandenburger & Nalebuff, 1996). Complementarities were argued to be related to economic benefits and therefore create an incentive for collaboration. Supporting this hypothesis, complementarities were positively related to social interaction and resource acquisition.

Building on the resource-based view, the study demonstrated the role of complementarities as enablers of value creation through resource sharing

(Rothaermel & Deeds, 2002; Rothwell, 1983; Teece, 1986). Similarly, building on the knowledge-based view (Lane & Lubatkin, 1998), the study also demonstrated the role of complementarities in influencing knowledge acquisition. These relationships were significant but mediated by social interaction.

Acknowledging the challenges in transferring knowledge across organizational boundaries and creating unique resource combinations by combining complementary resources, the study drew from social capital theory (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998; Yli-Renko et al., 2001) and demonstrated the role of social interaction in facilitating interorganizational learning and resource combination. Social interaction was positively related to resource acquisition and knowledge acquisition. Supporting the hypotheses, social interaction was shown to mediate the influence of complementarities on resource acquisition and knowledge acquisition. Finally, supporting the theories that stronger ties enable the transfer of tacit knowledge (Bresman et al., 1999; Dhanaraj et al., 2004; Kogut & Zander, 1992), resource acquisition was found to influence positively knowledge acquisition.

The part of the model explaining the endorsement effects builds on earlier research on interorganizational endorsements (Podolny, 1993, 1994; Stuart, 2000; Stuart et al., 1999). From this prior work, the study assumed the roles of partner prominence and venture uncertainty as drivers of the endorsement. The present study also assumed the underlying idea of this line of research that the coupling between the status (stemming from the association with prominent partners) and the quality of the venture could be loose. In other words, there could be value from associations with prominent partners even if they did not directly reflect the true quality of the venture. As suggested by Podolny (1993, 1994), Stuart et al. (1999), and Stuart (2000), endorsements could help to access critical resources and lead to better performance and quality, thus blurring the causality between status and quality. Supporting the hypotheses of Podolny (1993, 1994), Stuart et al. (1999), and Stuart (2000), it was shown that the greater the prominence of the corporate investor, the greater the endorsement benefits. Similarly, it was shown that the younger the venture, the greater the endorsement benefits.

Extending the framework of Stuart et al. (1999) on social mechanisms facilitating the implicit status transfer from prominent partners, the study integrated ideas from research on asymmetric information (Akerlof, 1970) and signaling theory (Spence, 1973) linking to a wide body of literature that has examined the role of prestigious underwriters (e.g. Beatty & Ritter, 1986; Booth et al., 1986; Carter & Manaster, 1990), auditors (e.g. Titman &

Trueman, 1986), and venture capitalists (e.g. Megginson & Weiss, 1991) in certifying the quality of the ventures going public, and thereby reducing the problems caused by asymmetric information between insiders and outside investors. From this line of research, the study assumed the role of signaling costs making endorsement more credible. It was shown that the stronger the relationship between the corporate investor and the venture, the higher the endorsement benefits.

Further extending the framework of Stuart et al. (1999), the study assumed from transaction cost economics (Williamson, 1975, 1985) the idea of risk (switching costs) increasing the weight that potential customers and partners give to signals of the quality of the venture (Swaminathan et al., 2001). The higher the switching costs for potential customers, the higher the value of endorsement.

Responding to the call for future research by Stuart et al. (1999), the present study has examined the endorsement from types of associations other than those examined by Stuart et al. (1999). The present study has demonstrated that endorsement is also an important value creation mechanism in the relationships between corporate venture capitalists and technology-based new firms. Further, partly responding to another suggestion for future research by Stuart et al. (1999), the present study has demonstrated the importance of complementarities as a factor influencing the endorsement benefits (mediated by resource acquisition), thus suggesting that aligned incentives improve endorsement. In so doing, the present study has extended our understanding of the factors influencing endorsement benefits. The model integrates complementary theoretical bases and predicts how various mechanisms are influenced by characteristics of the endorsing partner, the focal venture, the potential customers, and partners, as well as how the characteristics of the relationships between these constituents influence the strength and value of endorsement.

Managerial Implications

For entrepreneurs, the findings imply that complementarities between the businesses of the corporate investor and the portfolio company are a crucially important success factor in relationships with CVC investors. Thus, complementarities should always be considered by the entrepreneur when considering accepting an investment from a CVC investor. Other factors that influence the value-added include the prominence of the corporate investor, the age of the venture, and the nature of the venture business. Besides these initial conditions, the findings imply that social interaction

significantly and positively influences the resource and knowledge acquisition from the corporate investor.

For corporate investors, the findings suggest that complementarities should receive considerable attention in the due diligence process. As an important determinant of the benefits for portfolio companies, complementarities also influence the performance of CVC programs. In addition to the financial benefits from the success of the ventures, complementarities are likely to be directly related to the strategic benefits gained by the corporation. Similarly, social interaction is likely to be positively related to the benefits of both the parties. Clearly, the portfolio company CVC investor dyad needs purposeful nurturing if both parties are to fully realize the potential value-added benefits.

For independent venture capitalists, the same above-identified factors are important when considering inviting a corporate investor into an investment syndicate. The findings suggest that corporate investors may be a valuable party to an investment syndicate and that there are factors that can be influenced to increase the likely benefits from the corporate investor's participation.

Limitations of the Study and Directions for Future Research

There are no studies without limitations. First, even though this study combines both survey data and secondary data from different points of time, the nature of the study is essentially cross sectional. A longitudinal research setting could help to create further understanding on the value-added benefits from CVC investments because some of the benefits discussed in the present study may be only short-term benefits. Second, the present study focused on U.S. technology-based new firms. This focus was chosen because of the small number of CVC-backed ventures and the low availability of information outside the US. However, it would be interesting to examine how CVC works in other markets. Third, the present study focused on the dyadic relationships between the technology-based new firm and its most important CVC investor as measured by ownership share. In reality, CVC-backed, technology-based new ventures have often multiple investors. This focus on a single relationship is justified by the lack of in-depth studies focusing on relationship qualities. Several authors have argued for the need to focus on the characteristics of relationships with key constituencies in order to gain a richer understanding of the factors influencing the value and management of interorganizational relationships (Lane & Lubatkin, 1998; Stuart, 2000; Yli-Renko et al., 2001). However,

examination of the wider network (although demanding and restricting the depth of research on specific dyads) could add to the understanding of the role of corporate venture capitalists and other external parties on the performance of technology-based new firms. Fourth, in the examination of the relationships between the technology-based new firms and their most important CVC investors, the dyadic relationships were examined only from the entrepreneur's perspective. Simultaneous research of the relationships from both the entrepreneur and corporate investor perspectives would provide additional insights or at least provide additional factors to be considered. However, the practical implementation of such a study is difficult because of the inherent reduction in the sample size and the increase in time and costs (Mohr & Spekman, 1994; Yli-Renko et al., 2001). Fifth, this study employs primarily perceptual measures. In the present study, this strategy was intentionally chosen given the focus on the performance of the relationship with the largest CVC investor. Acknowledging that this is just one of the many interorganizational relationships, although important that a new venture may have, it would be difficult to infer the performance of the relationship from other sources than the person most knowledgeable of it, typically the CEO of the focal venture.

Overall, the present paper is the first to develop and empirically validate a comprehensive model on the value adding mechanisms, and the factors influencing these mechanisms, in the relationships between technology-based new firms and CVC investors. Besides contributing to the emerging literature on CVC, the present study contributes to a wider body of literature on interorganizational relationships. It has important implications both for researchers and practitioners regarding the nature, dynamic and management of value creation in interorganizational relationships.

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THE ROLE OF LEARNING IN INTERNATIONAL ENTREPRENEURSHIP[☆]

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In the increasingly knowledge-based global economy, firms proactively seek to internationalize earlier in their existence and more rapidly than in the past (Autio, Sapienza, & Almeida, 2000). Some ventures are even ‘born global.’ For many ventures, internationalization appears not just as an afterthought, but an essential gambit. However, internationalization inevitably alters the focus of a firm’s strategic attention (Ocasio, 1997). For firms that have internationalized, important questions are: ‘How much effort should be put in the international marketplace?’ and ‘how should our domestic activities evolve to accommodate our multi-country status?’

In the two studies reported below ‘organizational learning effort’ pertains to activities aimed at both building on existing knowledge and developing

[☆]This chapter is an integration of two articles: (1) Sapienza, H. J., De Clercq, D., & Sandberg, W. R. (2005). Antecedents of international and domestic learning effort. *Journal of Business Venturing*, 20(4), 437–457 (“STUDY 1”); and (2) De Clercq, D., Sapienza, H. J., & Crijns, H. (2005). The internationalization of small and medium-sized firms: The role of organizational learning effort and entrepreneurial orientation. *Small Business Economics*, 24(4), 409–419.

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new knowledge (Cohen & Levinthal, 1990). This description of learning effort is consistent with prior research that argued that organizational learning includes two modes, that is, exploitation and exploration (Levinthal & March, 1993). Exploration involves the search for new knowledge, skills and processes, whereas exploitation involves the incremental improvement of existing knowledge, skills and processes. Levinthal and March (1993) indicated that exploitation by itself may not be sufficient in the long run to maintain a competitive advantage, since the environment in which an organization operates changes over time. Therefore, organizational learning effort can be conceptualized as the extent of effort both to exploit existing knowledge and to explore for new knowledge. Such effort may be aimed at learning inside home country borders (i.e., domestic learning effort) or outside these borders (i.e., international learning effort).

In Study 1, the attention-based view and learning theory are used to develop theory and hypotheses regarding where internationalized firms devote their learning effort. The attention-based view of the firm argues that firm behavior depends on how its decision makers direct their attention across activities (Ocasio, 1997). More specifically, it holds that the focus of attention and effort depends upon what resources have been accumulated over time, what type of identity and relationships have been developed, and what rules are embedded within the organization. Thus, the current disposition of international assets, the international 'identity' the firm has developed, and the firm's orientation toward competing should all be critical as to where a firm directs its effort. Learning theory (Autio et al., 2000; Cohen & Levinthal, 1990; Zahra & George, 2002) holds that firms learn best when new knowledge is related to prior knowledge and when they devote significant intensity of effort in processing new external knowledge. As such, learning theory complements the attention-based view by revealing how much effort firms might devote to different external knowledge.

Study 1 focuses on the relationship between a firm's effort to learn from its home market and its foreign market(s) on the one hand and (1) its current foreign presence, (2) the extent of its foreign 'identity,' and (3) its overall orientation toward competing, on the other. First, the extent of a firm's current international presence could have an effect on the allocation of its learning effort. Second, the extent of a firm's international 'identity' will affect its attention. Some researchers (e.g., Autio et al., 2000; Brush, 1992) have argued that the age at which a firm internationalizes affects the extent to which it sees itself as primarily a single-country firm or as a truly 'inter- or multi-national' firm. Therefore, the age of the firm at foreign entry can be

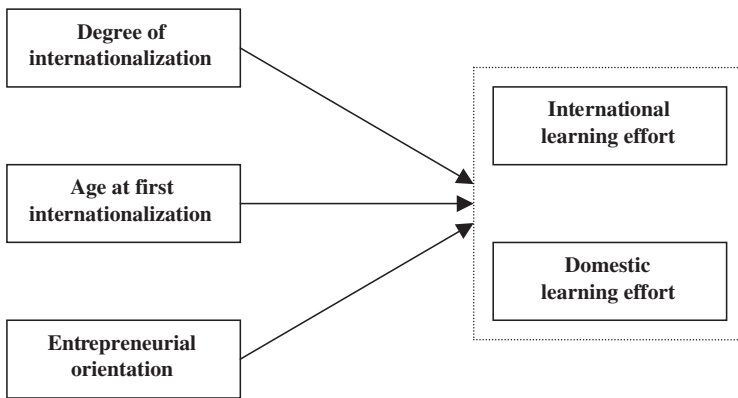


Fig. 1. Conceptual Model for Study 1.

seen as a proxy for its identity. Third, the firm’s entrepreneurial orientation (i.e., its proactivity, innovation, and risk-taking [Miller, 1983]) establishes the rules and norms for expending effort toward knowledge development and renewal. The model underlying Study 1’s arguments is presented in Fig. 1.

In Study 2 the consequences rather than the determinants of firms’ involvement in learning activities are examined. More specifically, it is studied why firms – once internationalized – to a greater or lesser extent further commit themselves to the international marketplace. An important framework used to examine factors related to internationalization in Study 2 is the behavioral view of the firm (Cyert & March, 1963). The behavioral view of internationalization focuses on the impact of international experience on the pace and direction of subsequent internationalization (Johanson & Vahlne, 1977). An important theme in the behavioral view is the role of organizational knowledge in the internationalization process. Furthermore, organizational learning theory is also useful for examining a firm’s propensity to invest in future cross-border activities (Autio et al., 2000; Cohen & Levinthal, 1990).

Some researchers have criticized the behavioral view for over-emphasizing the impact of organizational experience on internationalization efforts (Aharoni, 1966). It has been argued that Johanson and Vahlne’s (2003) framework does not explain why some firms engage in cross-border activities early on or why they proceed rapidly once first internationalization has taken place. For instance, McDougall, Shane, and Oviatt (1994) argued that firms may internationalize early because a top management team with

previous international experience may be willing and able to pursue new combinations of key resources across national borders early on in the firm's existence. In short, some researchers have recognized more explicitly the role of a firm's strategic choice and entrepreneurial character in the decision to enter the international arena (Child, 1972; McDougall & Oviatt, 2000). This recent stream of research, the new venture theory of internationalization, examines how competencies influence a firm's strategic choice to engage in cross-border activities (McDougall, 1989; McDougall & Oviatt, 2000).

Study 2's primary framework combines learning theory, with its roots in the behavioral theory of the firm, and the new venture theory of internationalization (Cyert & March, 1963; Cohen & Levinthal, 1990; McDougall & Oviatt, 2000). First, it is explicitly examined how knowledge development and renewal with regard to foreign and domestic activities may have an impact on perceptions about the opportunities offered by further internationalization. Second, the effect of entrepreneurial orientation on a firm's internationalization intent is examined. The model underlying Study 2's arguments is presented in Fig. 2.

The analyses for both studies were based on small international Belgian firms that engaged in cross-border activity. Firms in the sample compete in various industries including measuring equipment, construction, transportation, chemical, non-financial services, food, textile, computer peripherals, and others. The data were collected in the Spring of 2002 through a questionnaire addressed to each firm's CEO since research has shown that firms' top executives have relevant information about their internationalization (McDougall, 1989).

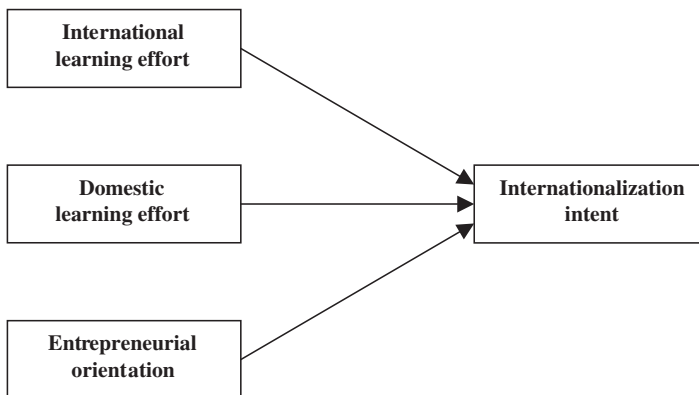


Fig. 2. Conceptual Model for Study 2.

STUDY 1

Study 1: Research Hypotheses

Learning theory suggests that organizations learn when the activities and experiences of individuals become assimilated into the routines, systems, and policies of the organization (Grant, 1996). A premise of study 1 is that the greater the attention a firm devotes to developing new knowledge and to exploiting existing knowledge, the greater its learning. This premise is consistent with prior theory which holds that the amount of information learned and the ease of its retrieval depend upon the intensity of effort expended in its acquisition (Cohen & Levinthal, 1990), and with the notion that a firm's behavior can be envisioned as the pattern of effort and attention devoted to specific activities (Ocasio, 1997). The extent to which firms devote attention to learning in the international as well as domestic marketplace can be considered as critical outcome variables, and an important question pertains to how several factors affect this 'learning effort.'

Degree of Internationalization and Learning Effort

Ocasio (1997) argued that a firm's behavior is partly affected by its existing resources, in that the nature of a firm's resources affects the extent to which the firm has the capabilities and skills to perform activities in a given area (Shane & Venkataraman, 2000). The degree of internationalization realized by a firm represents its allocation of its physical and human resources to foreign versus domestic activities; as such, it is a multidimensional construct (Sullivan, 1994). Degree of internationalization is likely to be associated with the attention a firm gives to exploring and exploiting opportunities in foreign markets because it shapes what resources the firm acquires, the rules of operations it adopts, and the relationships it develops. Eriksson, Johanson, Majkgård, and Sharma (1997) found that as degree of internationalization increases, perceived risks of further commitment to foreign markets diminishes. Johanson and Vahlne (1991) argued that the reduction of perceived risks would lead to broader and more intense devotion to new markets outside the firm's borders.

Learning theory suggests that more intense and repetitive processing leads to greater knowledge acquisition. As a firm devotes more resources to and obtains more sales from foreign markets, the intensity of its learning effort in these contexts may also increase (Ocasio, 1997). For example, Zahra, Ireland, and Hitt (2000) found that diversity of foreign market presence enhances technology-based firms' ability to learn in international markets.

In our setting, the implication is that firms' increase of their sources of foreign revenue, number of employees devoted to foreign activities, and scope of foreign operations will be associated with greater foreign learning effort. Thus, it is hypothesized:

Hypothesis 1a. The degree of internationalization is positively related to international learning effort.

Since degree of internationalization reflects not just the magnitude of a firm's foreign presence but also the importance of such presence relative to domestic activities, the issue arises as to internationalization's relationship to firms' learning effort in domestic markets. Is there a trade-off between the extent to which the firm devotes effort to foreign versus domestic learning activity when a firm is in many countries, or does international learning effort reinforce learning effort in the domestic marketplace? The earlier arguments suggest that the *capacity to learn* in domestic markets may increase with internationalization: broader and deeper experiences in varied markets may well raise a firm's overall learning capacity (Cohen & Levinthal, 1990; Zahra et al., 2000). However, the relative incentive to learn may diminish in the domestic market as the firm becomes more internationalized.

The degree of internationalization represents the weighted scope of a firm's operations. Learning through resources devoted to foreign markets may not have as full or as immediate an impact in the domestic market as it does in the markets from which it is derived. Consequently, with rising internationalization a firm is likely to shift its attention to foreign markets in order to reap fully the benefits of further expansion. Furthermore, if, as Johanson and Vahlne (1991) have argued, a firm's internationalization follows a pattern of movement to ever more geographically and culturally distant locales, the *benefits* of domestic learning effort will diminish correspondingly as the firm becomes more internationalized.

Hypothesis 1b. The degree of internationalization is negatively related to domestic learning effort.

Age at First Internationalization and Learning Effort

Prior research has suggested that firms develop their nature, mindset and identity early in their existence (Autio et al., 2000; Boeker, 1989). Therefore, a firm that embarks early on international operations is more likely to see itself from the outset as 'inter- or multi-national' (Brush, 1992) and will recognize early on the benefits of learning effort in foreign markets. In other words, operating internationally from an early age will likely affect what it

attends to and what it accumulates in a path-dependent manner (Ocasio, 1997). There is empirical support for an effect of age at first entry on learning outcomes and on identity. For instance, Autio et al. (2000) found that starting international activity early on increased the firm's international growth; they attributed this phenomenon to more effective learning in international markets. They argued that early internationalizers see foreign markets as less 'foreign.' Furthermore, when the firm internationalizes early on, it is less likely that relationships with domestic partners represent the sole or even primary source of the firm's business contacts (Autio et al., 2000). The attention-based view suggests that the firm's existing relationships are important drivers for firm behavior (Ocasio, 1997). That is, the firm's current engagement vis-à-vis others may give rise to future firm activities that are commensurate with the relationships that have been developed over time.

Therefore, the age at which a firm engages for the first time in international activities may create a situation in which possible constraints imposed by domestic relationships are diminished and further learning about international markets is promoted. In other words, early internationalizers are less affected by existing commitments to domestic market players, and more likely to develop knowledge through relationships that have been built in the international marketplace.

Hypothesis 2a. The firm's age at first internationalization is negatively related to its international learning effort.

The potential effects of early internationalization on domestic learning effort and attention is less clear. While it is possible that early foreign entry may help establish a general learning culture in a firm, the logic of Hypothesis 2a suggests that firms that venture beyond their own borders at a very early age will not identify as strongly with their domestic markets as firms that operated solely in one market for a longer period of time. Managers of firms that enter international competition late are likely to have built habits and routines that have affixed great attention to the domestic market (Ocasio, 1997). Furthermore, learning theory suggests that prolonged focusing of attention in a restricted domain creates competency traps that are difficult to overcome (Cohen & Levinthal, 1990; Levinthal & March, 1993). Therefore, when a firm initiates involvement in international activities early on, it is more likely to develop routines aimed at the international rather than the domestic marketplace. Conversely, the domestic learning routines of firms that internationalize late will be deeply embedded.

Hypothesis 2b. The firm's age at first internationalization is positively related to its domestic learning effort.

Entrepreneurial Orientation and Learning Effort

In the attention-based view, the rules or norms of a firm are critical to its ongoing effort. Thus, it can be expected that the entrepreneurial orientation of a firm will affect its learning effort in both foreign and domestic markets. Further, as entrepreneurial orientation represents the rules and norms by which a firm makes decisions (i.e., its 'organizing principles'), it is likely to be associated with domestic and learning effort in a consistent manner.

Firms that enter foreign markets are exposed to high uncertainty emanating both out of their own lack of knowledge and the increased complexity of operating in multiple, dissimilar markets (Eriksson et al., 1997; Johanson & Vahlne, 1991). Learning in a foreign market involves identifying and understanding a country's different requirements (e.g., product standards, industry norms, customer needs) as well as the tendencies and capabilities of local competitors (Eriksson et al., 1997; Zaheer & Mosakowski, 1997). The extent to which a firm engages in learning effort in new markets is likely to be related to its entrepreneurial orientation. For instance, the firm's propensity to proactively search for new business partners is reflected in its orientation (Lumpkin & Dess, 1996). Firms proactive in seeking foreign suppliers, customers, and alliance partners will more likely engage in intensive knowledge exchange with their foreign partners in order to benefit from these relationships.

Hypothesis 3a. A firm's entrepreneurial orientation is positively related to its international learning effort.

Entrepreneurial orientation is also likely to be positively associated with effort devoted to learning in the *domestic* market. Identifying, acquiring, and assimilating new knowledge may not be as risky in domestic markets as in foreign markets, but an entrepreneurial orientation implies proactive opportunity seeking in these markets as well. Learning in the domestic market requires special effort to review and challenge periodically all assumptions. By definition, entrepreneurially oriented firms seek new ways to do things and seek them without provocation. In short, learning effort in domestic markets should also be higher when the firm has a bias for action, i.e., an inherent characteristic of entrepreneurial orientation.

Hypothesis 3b. A firm's entrepreneurial orientation is positively related to its domestic learning effort.

STUDY 1: RESEARCH RESULTS

The hypotheses were tested using multiple regression analysis, and the results are shown in Table 1. The first column in Table 1 summarizes the results for Hypotheses 1a to 3a, which pertain to how the independent variables are associated with a firm’s international learning effort. Only firms that had already undertaken international activity (i.e., 76 firms) were included to examine international learning effort. Hypothesis 1a did not receive support: degree of internationalization is not related to international learning effort when controlling for all other variables. However, Hypothesis 2a was supported: age at international entry is negatively related to international learning effort. Finally, Hypothesis 3a was also supported: entrepreneurial orientation is positively related to international learning effort.

The second column in Table 1 summarizes the results for Hypotheses 1b to 3b, which pertain to how the independent variables are related to domestic learning effort. For this analysis firms were included irrespective of whether they had already taken international activity (i.e., 90 firms). First,

Table 1. Results of Study 1.

Dependent Variable →	International Learning Effort	Domestic Learning Effort
H1a&b: Degree of internationalization	0.136	-0.269*
H2a&b: Age at first internationalization	-0.225*	-0.252*
H3a&b: Entrepreneurial orientation	0.382**	0.384**
International experience	0.055	0.082
Firm size (log of number of employees)	0.041	0.149
Industry: Construction (SIC division C) ^a	0.278*	0.014
Industry: Manufacturing (SIC division D) ^a	0.733 [†]	0.429
Industry: Transportation (SIC division E) ^a	0.215	0.207
Industry: Wholesale trade (SIC division F) ^a	0.218	0.224
Industry: Retail trade (SIC division G) ^a	0.359 [†]	0.261
Industry: Service (SIC division I) ^a	0.304	0.231
<i>Adjusted R²</i>	0.246	0.120

Note: Coefficients are standardized beta weights.

** $p \leq 0.01$;

* $p \leq 0.05$;

[†] $p \leq 0.10$; one-tailed tests.

^aThe base industry is agriculture, forestry and fishing (SIC division A).

Hypothesis 1b was supported: degree of internationalization is negatively related to domestic learning effort. However, Hypothesis 2b was not supported: age at international entry is significantly related to domestic learning effort, but in the opposite direction than hypothesized. That is, early internationalization increases rather than decreases domestic learning effort. Finally, Hypothesis 3b received support: entrepreneurial orientation is positively related to domestic learning effort. The regression analyses also showed that the control variables 'years of internationalization' and 'firm size' were not significantly related to either international or domestic learning effort. However, firms in the construction and manufacturing sector were found to exert somewhat higher international learning effort than firms in other industry sectors.

STUDY 2

Study 2: Research Hypotheses

As mentioned earlier, the behavioral theory of internationalization assumes that international expansion can be described as a process in which the firm goes through incremental steps that reduce the uncertainty embedded in cross-border activity (Aharoni, 1966; Prasad, 1999). Basing their arguments on the experience of Swedish companies, Johanson and Vahlne (1977, 1991) explained both the pace and direction of subsequent international activities. For instance, they argued that a firm might change gradually the nature of its activities *within* a foreign country, i.e., from only export to fully owned overseas production investments, as well as *across* countries by expanding over time to countries that are more physically and culturally distant. In short, the behavioral approach toward internationalization focuses on a firm's gradually increasing international involvement through a series of incremental steps.

Study 2 argues that an important driver for increasing international commitment is the development of knowledge relevant to foreign markets. In other words, it is argued that organizational learning theory may provide a complementary framework to the behavioral view for explaining how activities aimed at knowledge development and renewal may foster cross-border activity.

International Learning Effort and Internationalization Intent

First, it is hypothesized that international learning effort has a positive impact on a firm's propensity to expand cross-border activity. Several arguments may be given for such positive relationship. First, when firms get more comfortable with the particular situations encountered in foreign

markets, the uncertainty related to further increasing the intensity and scope of international activities may diminish. Eriksson et al. (1997) posited that, over time, knowledge about foreign markets may reduce perceptions of the cost of further internationalization, which may lead to more intense commitment to those markets. Also, in their study on how U.S. small firms perceive export activities, Ogbuehi and Longfellow (1994) suggested that as firms get more information regarding foreign markets through accumulated export experience, they become more committed to engage in further export activities and emphasize more the importance of company growth.

Second, the more knowledge a firm has gained through intensive learning efforts, the more willing it will be to utilize and exploit this knowledge through subsequent international activity. In other words, the more intensively a firm engages in activities aimed at updating its current knowledge base with regard to foreign markets, the greater its store of foreign market knowledge will be, so that the return from acting upon new foreign investment opportunities is enhanced. Also, more intense, repetitive processing of foreign market knowledge may improve the efficiency of information retrieval in new but similar international environments, and therefore increase the propensity to expand cross-border activity (Cohen & Levinthal, 1990; Autio et al., 2000).

Hypothesis 4. A firm's international learning effort is positively related to its internationalization intent.

Furthermore, a positive relationship is suggested between the level of domestic learning effort and the propensity to internationalize further. The arguments are similar to the rationale given for the previous hypothesis.

First, as firms intensively engage in learning activities with regard to the domestic market, the uncertainty embedded in further internationalization may decrease. That is, a firm that spends significant time in updating its knowledge base with regard to competitors in the domestic market or domestic regulations, may take on a 'learning attitude,' which involves a continuous search about how to adapt to novel situations. In other words, by emphasizing domestic learning activities, the firm may indirectly become more knowledgeable and confident about how to learn from its current and potential stakeholders (for example, personnel, customers or suppliers) in the domestic market. This confidence may decrease the uncertainty embedded in further international expansion, especially when potential employees, customers and suppliers in new foreign markets share business and/or cultural characteristics with those encountered in domestic activity. Second, it can be argued that knowledge obtained from domestic learning may increase the potential return from increased future cross-border activity, and

therefore increase the propensity to engage in such activity. In other words, as firms acquire knowledge in their domestic market, their knowledge base may expand such that it provides the firm with better insights into how to leverage future cross-border activities.

Hypothesis 5. A firm's domestic learning effort is positively related to its internationalization intent.

In contrast to the behavioral view which focuses on the impact of organizational experience and knowledge on a firms' internationalization intent, the new venture theory of internationalization focuses on the role of firms' competencies in driving future cross-border activity. This theory builds upon the strategic choice view of organizational decision making as it focuses on the firm's pursuit of specific goals as an important motive for the pace and direction of internationalization (Child, 1972). More specifically, a firm may decide to increase its international activities when this strategic action is consistent with the resources and capabilities available to the firm (Baird, Lyles, & Orris, 1994; Barney, 1991). Also, prior research has suggested that a firm's strategic direction may have firms skip or compress stages in the internalization process and contribute to the decision to rapidly increase the scope of foreign activities (Sullivan & Bauerschmidt, 1990; Wolff & Pett, 2000).

It is hypothesized that firms which are higher in entrepreneurial orientation have a higher propensity to expand their cross-border activities. First, the notion of entrepreneurial orientation suggests that some firms are more willing than others to continually search for opportunities and solutions outside the realm of their current activities (McDougall, Shane, & Oviatt, 1994; Lumpkin & Dess, 1996). Decisions with regard to international expansion imply a high level of uncertainty as the firms enter physically or culturally distant markets or become more dependent on revenues generated in markets different from the more familiar domestic market (Calof & Viviers, 1995). Since firms high in entrepreneurial orientation are willing to undertake *risky* decisions (Miller, 1983; Lumpkin & Dess, 1996), they may more readily accept the uncertainty embedded in further increasing cross-border activity. Second, it can be argued that, all else being equal, firms high in entrepreneurial orientation are in a better position to take advantage of additional foreign opportunities, and therefore will be more willing to act upon such opportunities. For instance, the notion of *proactiveness* reflects the firm's propensity to undertake a continuous search for opportunities, especially opportunities that do not pertain to the firm's current activities. Therefore, a proactive firm may monitor environmental changes in a variety of countries on a frequent basis, even if it has not undertaken any formal

business transactions in those countries yet or does not intend to do so in the short term (Lumpkin & Dess, 1996). However, when environmental changes beneficial to a firm’s (increased) activities in those countries do arise (for example, the legal restrictions on foreign direct investment become much more flexible), such a firm may be confident that it can leverage the knowledge gained from its prior screening activities and, therefore, decide to expand its cross-border activities.

Hypothesis 6. A firm’s entrepreneurial orientation is positively related to its internationalization intent.

STUDY 2: RESEARCH RESULTS

All hypotheses were tested using multiple regression analysis. The results are summarized in Table 2 (based on the data from 92 firms). Strong support was found for Hypothesis 4: the relationship between international learning effort and internationalization intent is positive and significant. No support was found for Hypothesis 5. In fact, a weak but *negative* relationship was found between domestic learning effort and internationalization intent. Finally, support was found for Hypothesis 6: all else being equal, firms with a

Table 2. Results of Study 2.

Dependent Variable →	Internationalization Intent
H4: International learning effort	0.119*
H5: Domestic learning effort	-0.076†
H6: Entrepreneurial orientation	0.077†
Degree of internationalization	0.858**
Current sales volume	-0.072*
Industry: Construction (SIC division C) ^a	-0.051†
Industry: Manufacturing (SIC division D) ^a	-0.037
Industry: Transportation (SIC division E) ^a	-0.044
Industry: Wholesale trade (SIC division F) ^a	0.005
Industry: Retail trade (SIC division G) ^a	-0.054
Industry: Service (SIC division I) ^a	-0.030
Adjusted R ²	0.812

Note: Coefficients are standardized beta weights.

** $p \leq 0.01$;

* $p \leq 0.05$;

† $p \leq 0.10$; one-tailed tests.

^aThe base industry is agriculture, forestry and fishing (SIC division A).

high entrepreneurial orientation are more likely to further internationalize than firms low in entrepreneurial orientation. The inclusion of the control variables provided the following results. First, and not surprisingly, firms that had already a high degree of internationalization were found to be more willing to further engage in international activities compared to firms that have been less international so far. Second, we found a mildly negative relationship between a firm's sales volume and internationalization intent. Finally, no significant relationships between the industry group and internationalization intent were found.

DISCUSSION

Study 1

Study 1 examined the implications of firms' internationalization on their strategic attention in the international *and* domestic marketplace. The results regarding the *degree of internationalization* suggest that the scope of cross-border operations is related to organizational learning effort in domestic markets such that greater internationalization is associated with less domestic learning effort. This result may suggest that domestic strategic effort is affected by the scope of international operations. The lack of a relationship between degree of internationalization and international learning effort is the more surprising result. One explanation is the possibility that internationalization requires significant learning effort that is relatively invariant to the degree of internationalization. Alternatively, it is possible that beyond some low level of internationalization further increments do not add much to learning effort. Another possibility is that some aspects of internationalization are more related to learning effort than others. Overall then, the results suggest that greater involvement in international markets is associated with *less* domestic learning effort with perhaps marginally greater international learning effort. This relationship may represent a conscious tradeoff; it is also possible that the tradeoff is not a conscious one, but the unintended consequence of shifting resources from domestic to international effort. The potential consequences of such a shift represent a fertile area for study.

The finding that *earlier initiation of international activity* foretells greater learning effort is consistent with the idea that early venturing into new environments may embed in firms a propensity for experimentation. This interpretation is consistent with [Autio et al. \(2000\)](#), who argued that early internationalizers might be able to learn more rapidly in new foreign settings

than those who internationalize at an older age. The results suggest that the earlier a firm ventures abroad, the more fully that step embeds in the firm an identity conducive to learning (Ocasio, 1997). One possibility is that early internationalizers avoid subsequent 'lock-out' from new knowledge (Cohen & Levinthal, 1990) as their learning culture allows more effective assimilation of international knowledge than other firms can attain. The earlier that this process begins, the stronger the firm's learning culture should become and the more it will learn about both foreign and domestic markets. Consistent with Zahra et al. (2000), our results regarding domestic learning effort suggest that early international operation affects the whole organization rather than being restricted to its unit(s) dedicated to international activities.

The results regarding *entrepreneurial orientation* suggest that a proactive, experimental market stance involves active learning at home and abroad. Lumpkin and Dess (1996) proposed that an entrepreneurial orientation will lead to better organizational performance but did not explain how this takes place. Study 1's results proposed that the effects of entrepreneurial orientation may be realized through its association with learning effort. It could be that an entrepreneurial orientation promotes a learning-by-doing dynamic whereby firms *must* assimilate more information – whether regarding domestic or international markets (or both) – in order to survive the additional requirements of this strategic posture. If successful, such increased attention may lead to increased dynamic capabilities (Zahra et al., 2000).

Study 2

Study 2 examined the implications of firms' learning effort and entrepreneurial orientation on their commitment to increase their international commitment. The positive relationship that was found between *international learning effort* and internationalization intent indicates that efforts aimed explicitly at knowledge renewal and exploitation with regard to specific foreign markets and the internationalization process in general increase the propensity to expand cross-border activities. As mentioned earlier, the rationale for this positive relationship may lie in the role of foreign knowledge in diminishing the uncertainty embedded in international expansion, or in increasing the willingness to leverage this knowledge in additional cross-border activities.

Study 2 extended prior research that examined the effect of learning on future international activities by studying the combined effect on the intent to further internationalize learning activities undertaken in foreign markets *and* in the domestic market. Interestingly, no support was observed for the hypothesis that *domestic learning effort* is positively related to plans to

increase international activities. It was found that the relationship between a firm's domestic learning effort and its internationalization intent is mildly significant but in the opposite direction as hypothesized. One possible explanation for this finding is that cross-border activity asks for information specifically related to the foreign market or the internationalization process; i.e., knowledge renewal and development in the domestic market may be too 'general' to reduce uncertainty associated with overseas investments. Another explanation is that organizations are boundedly rational; i.e., their ability to process information efficiently is limited (March & Simon, 1958). More specifically, even if the willingness to undertake future international activities depends in part on intense and repetitive processing of knowledge pertaining to both the foreign and domestic markets, the knowledge gained from activities in the domestic market may require more time to be assimilated in order to be useful for future internationalization. However, the interesting aspect of Study 2's results is that the level of domestic learning effort was found to have a negative rather than neutral effect on the intent to further internationalize. In other words, it was found that too much of a focus on learning aimed at the domestic market may actually diminish the firm's attention to future internationalization possibilities.

The results regarding the positive relationship between *entrepreneurial orientation* and internationalization intent complements prior research that looked at the effect of a firm's entrepreneurial character on organizational performance (Lumpkin & Dess, 1996). Study 2 argued that entrepreneurial orientation may reflect the firm's strategic choice to further expand cross-border activities, all else being equal. In other words, substantial and successful presence in foreign markets may partly depend on a firm's moving proactively into new markets or taking on an innovative and risk-seeking posture. The bias-for-action that is suggested within an entrepreneurial orientation may help overcome the general reluctance to change associated with cross-border activities (Aldrich, 1979) as well as stimulate the willingness to build partnerships with existing international players (Acs, Morck, Shaver, & Yeung, 1997). Consequently, entrepreneurially oriented firms may experiment more freely and thereby be more willing to adopt an 'international orientation.'

CONCLUSION

The results reported in Study 1 help to clarify the factors that promote or inhibit *organizational learning* among independent companies when their

domestic economy may offer insufficient opportunities for growth. The results suggest that firms can undertake significant effort to learn about international markets regardless of their years of international experience. Moreover, the results suggest that if learning is essential to success, the firm may be well advised to adopt an entrepreneurial orientation and enter foreign markets early rather than risk falling behind competitively. Furthermore, the fact that high levels of internationalization retard domestic learning effort is potentially important. Reduced attention to learning in the domestic market could impair effectiveness, a possibility salient both for individual firms and for government policy initiatives.

The results reported in Study 2 help to clarify the factors leading to or inhibiting *additional international activity*. The results suggest that intensive knowledge renewal and exploitation regarding foreign markets and the internationalization process itself may increase further internationalization by affecting the perceptions of opportunities offered by further international expansion. Also, firms that engage in radical innovation, undertake bold, aggressive actions, or are willing to assume risks, may be more likely to develop a long-term, substantial presence in the international arena, compared to firms that are more reactive or conservative. Finally, international and domestic learning activities are complementary: they tend to co-vary, and they tend to be related in the same ways with entrepreneurial orientation; however, our results suggest that firms that invest in domestic learning activities, as opposed to international learning activities, may be less likely to internationalize further; this may ultimately hamper firm success in the long term.

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