

EXPLORATION IN LARGE, ESTABLISHED FIRMS: IDEA GENERATION AND CORPORATE VENTURING

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ABSTRACT

Exploration - “experimentation with new alternatives”¹ – presents an ongoing challenge to large, established firms. A myriad of inertial factors encourages firms, instead, to exploit their existing competences and paradigms, with adverse consequences for their long-term adaptability. Corporate entrepreneurship (CE) may, however, provide one avenue for incumbent firms to pursue exploration.

This dissertation comprises two empirical studies that examine CE as a vehicle for exploration. The first study examines idea generation via dispersed CE (i.e. entrepreneurial initiatives originating across an organization²). It investigates knowledge-based and information-processing antecedents of corporate entrepreneurial idea generation. It draws on exploratory research with 20 knowledge-workers in a multi-national FMCG company; a survey of 388 knowledge-workers across three diverse multinational organizations, supplemented by supervisory ratings; and longitudinal case studies of knowledge-workers observed over a year. A new unit of analysis – the ‘idea set’ – is introduced to aid understanding of the genesis of corporate entrepreneurial ideas. Its questionnaire-based instrument shows evidence of convergent, divergent and predictive validity. Using this construct, somewhat different sets of individual knowledge, contextual stimuli, and cognitive processes are found to underlie the novelty and volume of ideas corporate knowledge-workers generate.

The second study addresses focused CE (i.e. a mandated organizational unit within a parent firm identifying and nurturing new business opportunities) via corporate venture (CV) units. It utilises exploratory interviews, a survey of CV unit managers, and survival and investment data on an international set of 95 CV units. Well-established theoretical perspectives are introduced to better account for multiple performance outcomes in such units. Specifically, configurational analysis demonstrates the importance of the internal alignment of relationships, systems and activities within types of CV units on their performance. In addition, the likelihood

¹ March, J. G. 1991. Exploration and exploitation in organizational learning. *Organization Science*, 2(1): 71-87.

² Birkinshaw, J 1997. Entrepreneurship in multinational corporations: The characteristics of subsidiary initiatives. *Strategic Management Journal*, 18(3): 207-229.

of CV survival is found to be enhanced by it acting ambidextrously - i.e. engaging simultaneously in both exploration and exploitation.

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To my husband,
Massimiliano Delle Donne,
and my grandmother,
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for their
constant love and support.

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CHAPTER I

INTRODUCTION

1.1 Background

Exploration - “experimentation with new alternatives” (March, 1991:85) – presents an ongoing challenge to large, established firms. A myriad of inertial factors encourages firms, instead, to exploit their existing competences and paradigms, with potentially adverse consequences for their long-term adaptability. The gamut of challenges to adaptability faced by large, established firms include the increasing entrenchment over time of their mindsets, capabilities and routines (Leonard-Barton, 1992; Nelson & Winter, 1982; Tripsas & Gavetti, 2000) – in all, efforts towards organizational exploration typically confront a systemic set of obstacles.

A growing and increasingly influential literature on corporate entrepreneurship (CE) (Dess et al., 2003; Guth & Ginsberg, 1990; Sharma & Chrisman, 1999; Stevenson & Jarillo, 1990; Zahra, Jennings, & Kuratko, 1999) indicates, however, a number of avenues through which incumbent firms may pursue exploration. Rather than becoming mired in the obstacles large, established firms face, this literature focuses on mechanisms through which firms can engage in venture building and renewal. The scope of CE is wide, as indicated by the following definition (Sharma & Chrisman, 1999: 18):

Corporate entrepreneurship is the process whereby an individual or a group of individuals, in association with an existing organization, create a new organization or instigate renewal or innovation within that organization.

Accordingly, the forms CE can take are highly diverse. This dissertation employs Birkinshaw’s (1997) distinction between ‘focused’ and ‘dispersed’ CE modes to investigate two key domains of entrepreneurial behavior within large firms. Specifically, ‘dispersed corporate entrepreneurship’ describes entrepreneurial initiatives originating via employees across different

organizational units, while ‘focused corporate entrepreneurship’ involves a mandated organizational unit within a parent firm identifying and nurturing new business opportunities (Birkinshaw, 1997). Although, as yet, a small body of empirical research, studies do suggest that dispersed CE positively impacts organizational wealth creation, growth and profitability (Antoncic & Hisrich, 2003; Zahra, 1991, 1993; Zahra & Covin, 1995).

In terms of *dispersed corporate entrepreneurship*, this dissertation investigates the antecedents and processes through which employees across large, established firms generate entrepreneurial ideas, focusing particularly on the roles of knowledge and context therein. This is a highly neglected area of theory and research. Within the small but rapidly growing literature on dispersed CE, an influential stream of research has examined the antecedents, characteristics and outcomes of firm-level entrepreneurial ‘posture’ (cf. Covin and Slevin’s, 1991, entrepreneurial orientation construct) (Covin & Miles, 1999; Dess, Lumpkin, & McGee, 1999; Morris, Kuratko, & Covin, 2008). At present, this literature is concerned primarily with aggregate firm-level entrepreneurial indicators and has not sought to understand more micro-level corporate entrepreneurial phenomena to any degree.

Indeed, informal entrepreneurial activities³ within firms have seldom been closely examined (Zahra, Jennings, & Kuratko, 1999), and doing so creates a number of significant empirical challenges both for sampling and data collection. Moreover, idea generation (or innovation, more broadly) has typically – following the diffusion of R&D laboratories from the German synthetic dye industry to large US corporations in the second half of the nineteenth and first half of the twentieth centuries (Freeman, 1982; Murmann, 2003) – been seen as the preserve of a select (and organizationally separate) group of scientists within corporations. Dispersed models of opportunity recognition or idea generation (Birkinshaw, 1997; Kanter, 1988, 1999; Lee & Williams, 2007; Pinchot, 1985) challenge these assumptions and have only recently started to build a foothold of interest and legitimacy in management scholarship.

³ Our conceptualisation of dispersed entrepreneurial activities as occurring informally across multiple areas of firms corresponds well with Pinchot’s (1985) use of the term ‘intrapreneurship’. It should be noted, however, that in contradistinction to our usage, this term has at times also used by authors to include also small units mandated with corporate entrepreneurial activities (cf. Sharma & Chrisman, 1999).

Regarding *focused corporate entrepreneurship*, this dissertation investigates the managerial and organizational factors impacting the performance and survival of corporate venture (CV) units. CV units constitute one type of ‘focused’ mechanism⁴ via which a firm may identify and exploit new business opportunities; others include (but are not restricted to) joint ventures, spin-offs and technology scouting units (Keil, 2002, 2004). We define corporate venture units as distinct organization units controlled by parent firms that have responsibility for investing in business opportunities that are new to their parent corporations (cf. Block & MacMillan, 1993; Burgelman, 1984). By our definition, CV units may invest in both external and internal corporate ventures (cf. Sharma & Chrisman, 2001). We hence take a *formal* perspective (Zahra et al., 1999) on corporate venturing here, addressing only the set of corporate ventures pursued through a specially designated organizational unit⁵.

Despite the fundamental importance of issues of success and survival to CV unit theory and practice, and a burgeoning literature examining corporate venture capital (CVC) units (i.e. externally-oriented corporate venture units) via archival databases (e.g. Dushnitsky & Lenox, 2005, 2006; Keil, 2002, 2004; Keil, Maula, Schildt, & Zahra, 2008; Maula, 2007; Schildt, Maula, & Keil, 2005; Wadhwa & Kotha, 2006), little of a definitive nature is currently known about the determinants of CV unit outcomes.

The remainder of the chapter provides the background to this dissertation, overviewing its research questions, methods, principal arguments, and the literatures that inform these arguments.

⁴ It is worth noting that corporate venturing is defined in a variety of ways in entrepreneurship literature (cf. Sharma & Chrisman, 2001). Authors typically agree that corporate venturing involves “corporate entrepreneurial efforts that lead to the creation of new business organizations” for parent companies (Sharma & Chrisman, 2001: 19). Where they tend to differ is whether or not these entrepreneurial efforts necessarily involve coordination by distinctive (in a structural sense) parent company organizational units. Our approach here is consistent with the former definition, and thus with that taken by, for example, Burgelman (1984, 1985) and Siegel, Siegel and MacMillan (1988) when focusing on the ‘new venture division’. Other authors have employed less restrictive definitions of corporate venturing, addressing rather entire ‘corporate venture programmes’ undertaken by corporations, irrespective of their coordination mechanisms (e.g. Kanter, North, Bernstein, & Williamson, 1990; Kanter, Richardson, North, & Morgan, 1991; McGrath, Venkataraman, & MacMillan, 1994; Thornhill & Amit, 2001). The latter approach also characterises contemporary CVC literature (cf. Dushnitsky, 2006; Maula, 2007), probably, in part, as a consequence of the fund-level structure of the Venture Economics database used extensively in this research domain.

⁵ Our formal perspective on corporate venturing – via the focus on CV units – does not, however, preclude the initial emergence of ventures (or their ideas) through informal, autonomous venturing channels (Burgelman, 1983, 1991) within the remainder of the parent company. It merely denotes the coordination of such ventures within a structurally separate CV unit, at some stage of the venture’s lifetime.

1.2 Research Domain and Questions

Open questions and under-explored areas within the young and rapidly growing CE literature are bountiful. As outlined above, we chose to focus on two specific research domains within this field, namely: (1) opportunity recognition via dispersed modes of CE; and (2) CE via focused corporate venture units. These domains are both currently under-researched but are arguably central to contemporary conceptualisations of CE, which recognizes both focused and dispersed modes of co-ordinating entrepreneurial activity (cf. Sharma & Chrisman, 1999), and that identifies the recognition and exploitation of opportunities as being at its heart (Shane & Venkataraman, 2000; Venkataraman, 1997).

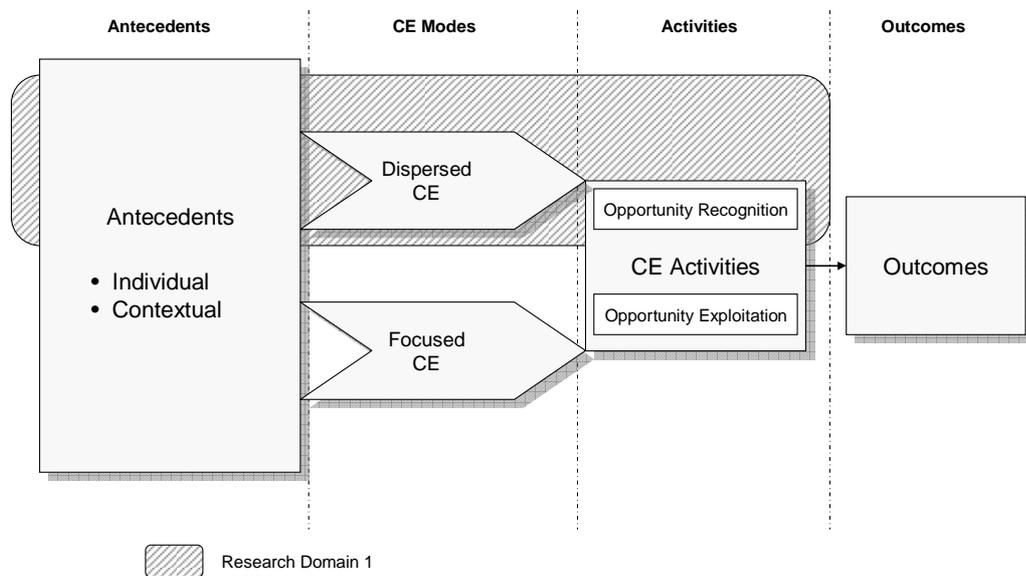


Figure 1-1 Research Domain 1: Dispersed Corporate Opportunity Recognition

The scope of the first research domain – viz. opportunity recognition via dispersed CE modes – is represented by the darkly shaded portion of Figure 1-1. Our focus here is on

understanding the antecedents of opportunity recognition by knowledge workers⁶ across a firm, that is, knowledge workers not separated within a discrete ‘exploratory’ unit such as a R&D laboratory, a CV unit or a technology scouting unit. To date, this has been the subject of extremely little research (to be reviewed in Section 1.4.1). Given the essentially cognitive, intra-personal nature of opportunity recognition and the key role knowledge plays therein (Baron & Ensley, 2006; Corbett, 2007; Dimov, 2004; Shane, 2000, 2003), the primary research question guiding our investigation of this domain is the following:

How do individual knowledge and contextual stimuli influence the nature of entrepreneurial opportunities recognized by corporate knowledge workers?

This begs the following question, which also forms part of our investigation:

Along which dimensions may opportunities recognized by corporate knowledge workers meaningfully be differentiated?

The scope of the second research domain – viz. CE via focused corporate venture units – is represented by the darkly shaded portion of Figure 1-2. Our focus here is on understanding the processes, systems and structures used by CV units to successfully recognize and exploit entrepreneurial opportunities for their parent companies. We take a CV unit level of analysis and frame our primary research questions in terms of the factors impacting their performance and survival. That is:

Which processes, systems and structures are associated with superior corporate venture unit performance?

Which processes, systems and structures are associated with corporate venture unit survival?

⁶ The term ‘knowledge worker’ was coined by Drucker (1959, 1973) to refer to persons involved in a specific category of work, that is: work that is primarily concerned with information, and its use and development into knowledge. The resources of the knowledge worker principally include specialized learning or competencies rather than land, labour or other forms of capital. This term is typically used to refer to a wide spectrum of professional (including managerial) workers, and has gained fairly widespread usage (if not always precision of meaning) in management literature. We use it here to demarcate the category of corporate workers to which we contend our exposition will hold; our knowledge-based, cognitive propositions are likely to be less applicable to those falling into more manual and administrative categories of work in corporations.

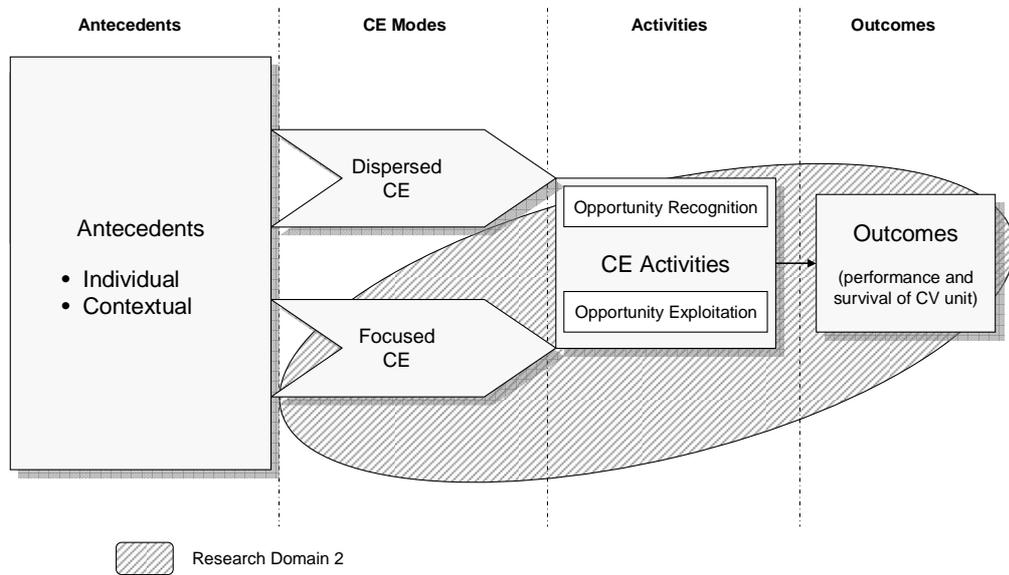


Figure 1-2 Research Domain 2: Corporate Entrepreneurship via Focused Corporate Venture Units

Despite the fundamental nature of these questions to CV unit theory and practice, these questions carry with them many unresolved issues and debates (to be discussed further in Section 1.4.2).

1.3 Research Methods

Investigating the research questions outlined above presented significant empirical challenges. Consequently, periods of initial exploratory research into the phenomena of interest and careful thought went into the design of the two studies that constitute this dissertation. In addition, field rather than archival methods were indicated for both studies given the absence of public data bases examining the relevant organizational processes and characteristics. Unique databases hence resulted for the studies.

For *Study 1*, which examined the antecedents and processes of dispersed idea generation in large, established firms, probably the greatest challenge was conceptualising and operationalizing the multiple core (and little researched, especially within corporate settings) constructs. These constructs concerned, inter alia, the characteristics of new ideas, of individual knowledge profiles, and of the contextual stimuli that embed corporate knowledge workers. An associated challenge – driven in large part by our desire to capture both early stage as well as more highly developed ideas - was how to examine a primarily intra-personal cognitive phenomenon (viz. idea generation by knowledge workers) in a sufficiently comprehensive and accurate manner. These challenges are discussed in depth in Hill (2003) and are central to the idea set unit of analysis we advocate in Chapter 2.

We decided to follow a three-phase approach in Study 1. First, we conducted in-depth exploratory interviews with 20 knowledge workers in a multinational FMCG company in order to better understand the phenomenon of corporate idea generation. Second, we collected self-report survey data from 388 knowledge workers across three multinational companies in different sectors. This survey examined antecedents to, and processes of, dispersed idea generation. Two rounds of pilot questionnaire development and testing preceded the administration of the survey. We supplemented the self-reported survey data with supervisory ratings of the more visible aspects of idea generation in one of the participating companies. Finally, we undertook 12-month case studies of 22 individuals from two of the companies that participated in the survey. This longitudinal data was collected to provide rich information against which to triangulate the quantitative survey data, as well as to facilitate greater insight into the dynamic aspects of corporate idea generation than possible merely via the cross-sectional survey data. Further details of the methodology for Study 1 are provided in Chapter 2.

For *Study 2*, which examined the practices, processes and structures impacting CV unit performance and survival, probably the greatest challenges were: (1) formulating a valid sampling frame through which to identify CV units given that these are seldom (especially internally-oriented units) legally distinct structures and are hence rarely recorded in company reports; and (2) obtaining data on multiple venture unit outcomes, given (again) that companies are typically not required to report independently on the financial performance of such units and that they, for strategic reasons, frequently do not wish to disclose these details to researchers.

Once more, a multi-phase and multi-source field research design was utilised⁷. First, in-depth exploratory interviews were conducted with 50 individuals in 40 CV units across eight countries, in order to understand current practices regarding corporate investment in venturing. Second, building on the insights from the exploratory interviews, a postal survey of managers of CV units was conducted. The primary sampling frame comprised units listed in the Corporate Venturing Directory and Yearbook, along with other CV units identified by the researchers through snow-balling techniques, contact with professional corporate venturing bodies, and attendance at major corporate venturing conferences. Useable responses were obtained for 95 CV units.

The third phase involved supplementing the self-reported measures from the questionnaire with Venture Economics data on the investment histories of the participating CV units, where such data were available (for 71 of the units). Finally, CV unit survival data was collected two years after the survey. This survival data served as an additional, 'objective' outcome measure, as well as being a variable of considerable interest in its own right given limited scholarly research into the reasons behind the typically short life-span of these units (Burgelman & Valikangas, 2005; Fast, 1979, 1981). The survival information was sourced via follow-up phone calls to the managers of the units that had participated in the mail survey, and supplemented by archival information searches. As a result, this database is the most extensive to date in its coverage of both internally- and externally-oriented corporate venture units (Dushnitsky, 2006). Further details of the methodology for Study 2 are provided in Chapter 4.

1.4 Major Concepts and Theoretical Perspectives

This section introduces the major theoretical perspectives (or relevant literature streams, as may be the case) that inform this dissertation. It also defines key concepts introduced into the dissertation from these theoretical perspectives. Perspectives informing the dispersed corporate

⁷ It should be noted that the first two phases of Study 2 were designed and conducted by Professor Julian Birkinshaw. I became involved in the research project once these phases were completed.

opportunity recognition component of the dissertation are introduced first; perspectives informing the venturing via focused CV units component are introduced thereafter.

1.4.1 Dispersed Opportunity Recognition in Large, Established Companies

Three literatures were particularly informative to our exposition of dispersed opportunity recognition, namely: (1) entrepreneurship literature on opportunity recognition; (2) organizational creativity literature; and (3) technological search literature. These are all concerned, in one way or another, with the introduction of ‘variation’ (i.e. novelty) (Campbell, 1969; Staw, 1990) into economies or economic organizations. The approaches and foci of these three literatures are summarised in Table 1-1.

Entrepreneurship Opportunity Recognition Literature: The mainstream entrepreneurship literature is seemingly the natural starting point for understanding opportunity recognition in corporate contexts, given that prominent entrepreneurship scholars have defined opportunity recognition, along with opportunity exploitation, as a defining feature of the entrepreneurship discipline (Shane & Venkataraman, 2000). This has prompted burgeoning research into opportunity recognition (see reviews by Dimov, 2004, and Gaglio, 2004), although little is yet published in peer-reviewed journals (Corbett, 2007; Ireland & Webb, 2007).

The theoretical underpinnings, disciplinary perspectives and research methodologies in the entrepreneurship opportunity recognition domain are diverse. One key debate, and source of some division within the field, is along the philosophical question of whether or not entrepreneurial opportunities are objective phenomena (Companys & McMullen, 2007; McMullen & Shepherd, 2006). In other words, whether or not opportunities have an existence independent of those who identify and seek to exploit ‘them’ is in contention. At one end of the debate are those scholars who assert the independent existence of entrepreneurial opportunities (cf. Shane, 2000, 2003; Shane & Venkataraman, 2000). Accordingly, opportunities are there to be ‘discovered’ or ‘recognized’ by those with appropriate characteristics, such as entrepreneurial alertness and superior knowledge in a given domain (cf. Kirzner, 1973, 1979; Shane & Venkataraman, 2000). Shane & Venkataraman (2000: 220), as strong advocates of the objective existence of opportunities, define entrepreneurial opportunities as “those situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater

	Empirical Setting	Methods	Context	Person	Process	Idea
Opportunity Recognition	Independent start-ups	Mix of methods, including: (a) interviews and surveys of business founders, and (b) quasi-experiments with students.	Little attention given to context	Previous work (much now discredited) focused on personality variables distinguishing entrepreneurs from others. Recent work focuses on cognitive styles and abilities, and human capital factors, impacting opportunity recognition.	A range of cognitive processes underlying opportunity recognition are under investigation.	Few distinctions drawn between opportunities in empirical research. Opportunities identified are sometimes counted.
Organizational Creativity	Employees in companies	Mix of methods, frequently experiments, surveys and critical incident analyses	A range of organizational factors are considered to foster or hinder creativity. Their operative mechanism is assumed to be motivational.	A range of individual characteristics are examined, including personality, cognitive and skill factors.	Little attention given to creativity processes.	Consensual agreements from a number of raters or supervisory assessments of the novelty and value of ideas/other creative outputs.
Technological Search	R&D staff in large firms	Archival data sources, typically patent citation analysis	Context is conceptualized in terms of the distance of search – across geographic, organizational, technological, and (more recently) temporal dimensions.	Individual characteristics of innovators not directly modelled – congruence between their experience and their firm’s existing knowledge base is assumed.	Recombinant innovation processes emphasized	A count measure is typically used to describe the volume of innovations (typically new technologies and/or products).

Table 1-1 Overview of Contributing Literatures on Idea Generation

than their cost of production”. Objective market conditions – typically, changes in the structures of markets (Geroski, 1990; Klevorick, Levin, Nelson, & Winter, 1995) – are seen to simultaneously introduce new and foreclose previous entrepreneurial opportunities.

On the other end of the debate are those holding a more subjectivist philosophy towards the topic of entrepreneurial opportunity. Scholars of such a persuasion conceive of entrepreneurial opportunities as the products of human cognition, viewing endeavours to establish their objective existence as, at best, empirically nonverifiable, and, at worst, a philosophically futile position. For this school, opportunities are ‘created’ or ‘formed’ by individuals and social collectives (Dimov, 2004; Fletcher, 2006; Sarason, Dean, & Dillard, 2006) – in other words, ‘opportunity is in the eye of the beholder’. It should be noted, however, that most entrepreneurship researchers have not explicitly articulated their philosophical orientation towards the independent existence of entrepreneurial opportunities (or otherwise), and that many research methods⁸ – albeit not the language employed to interpret these or theorise there from – are, presently at least, indifferent to whether a subjectivist (i.e. ‘opportunity creation/formation’) or objectivist (i.e. ‘opportunity discovery/recognition’). For example, case studies have been utilised to investigate the antecedents of entrepreneurial opportunities from different extremes of approaches (cf. Fletcher, 2006, and Shane, 2000, by way of illustration).

Despite the diversity within the domain, a few general trends and characteristics are discernable. In general, opportunity recognition research focuses on individual, so-called ‘independent’ rather than corporate entrepreneurs (for an exception concerning corporate scientists see O’Connor & Rice, 2001), examining either ‘who sees opportunities’ or the process through which opportunity recognition takes place. Fundamentally, it emphasizes the person and process components referred to in Table 1-1. Earlier opportunity recognition researchers of the 1990s used a range of research methods, frequently retrospective interviews with business founders, often against rather crude control groups of ‘non-entrepreneurs’ (such as corporate managers or non-business founders). Investigations into the roles of creative thinking (e.g. Hills, Shrader, & Lumpkin, 1999) and the Kirznerian (1973, 1979) entrepreneurial alertness trait (e.g.

⁸ One stream of research that does appear to have a methodology that is fairly specific to its objectivist perspective on opportunity is work which examines industry ‘regimes’ as sources of opportunity (e.g. Geroski, 1990; Klevorick et al., 1995).

Kaish & Gilad, 1991) were prominent in this earlier period. Some attention was also accorded to independent entrepreneurs' search processes, in studies that asked business founders which sources they used to identify opportunities (e.g. Hills & Shrader, 1998).

Recent studies frequently employ experimental procedures or verbal protocol interviews to examine cognitive processes underlying opportunity recognition, such as the roles of heuristic thinking and pattern recognition, along with the impact of domain-relevant knowledge (e.g. Baron & Ensley, 2006; Corbett, 2007; Dimov, 2003; Gregoire, Barr, & Shepherd, 2006; Sarasvathy, 2001; Shepherd & De Tienne, 2005). The jury is still out on exactly the cognitive process(es) involved in opportunity recognition, although the findings of reported studies on the role of prior domain relevant knowledge in opportunity recognition have been overwhelmingly positive to date (Corbett, 2007; Dimov, 2004; Shane, 2000).

Less attention has been accorded to the role of context within opportunity recognition literature (Dimov, 2004, 2007). Aside from industry level studies (e.g. Geroski, 1990; Klevorick et al., 1995) that takes a realist perspective (viewing entrepreneurial opportunities as existing independently) and attempts to identify environmental conditions that constitute opportunities, the impact of context on opportunity recognition has been largely ignored (Dimov, 2004, 2007). An exception is a small body of research starting to look at how social networks impact opportunity recognition amongst independent entrepreneurs (Arenius & De Clercq, 2005; Ozgen & Baron, 2007). Context (Magnusson, 1981), indeed, represents an often under-developed construct in the cognitive psychological theories on which much of the opportunity recognition literature is based.

As for the opportunity construct itself, there have been only a few attempts to further dimensionalize it. These theoretical endeavours have mostly arisen from a desire to identify different forms of risk associated with different 'types' of opportunities (Ardichvili, Cardozo, & Ray, 2003; Sarasvathy et al., 2003), specifically the information available on 'supply' and 'demand' components of opportunities. More frequently though, opportunity recognition researchers have used business formation as a historical proxy for opportunity recognition having occurred (Ardichvili & Cardozo, 2000; Baron & Ensley, 2006; Gaglio, 2004 Ucbasaran, Westhead, Wright, & Binks, 2003), despite different sets of factors impacting opportunity exploitation and opportunity recognition (Corbett, 2007; Davidsson & Honig, 2003; Dimov &

Shepherd, 2005; McMullen & Shepherd, 2006). There is also a (less common and more recent) practice of examining counts of opportunities identified or exploited (e.g. Corbett, 2007; Dimov, 2007; Shepherd & De Tienne, 2005), frequently in response to survey-based quasi-experiments.

Organizational Creativity Literature: A small body of literature examining creativity in organizations is also germane to early-stage idea generation processes in corporate contexts. This stream has its roots in individual creativity research, and has consequently emphasized individual factors over contextual factors in explaining organizational creativity (Drazin, Glynn, & Kazanjian, 1999; Mumford, 2003; Shalley & Gilson, 2004). It remains predominantly rooted in a psychological perspective, emphasising individual-level creative outcomes (Drazin et al., 1999) over team or organizational levels of analysis.

A fairly robust set of individual factors have been found to be associated with creativity, including personality factors, cognitive styles and abilities, and motivational factors (Amabile, 1988; Shalley & Gilson, 2004; Woodman, Sawyer, & Griffin, 1993). Domain-relevant knowledge is also frequently identified as a precursor to individual creativity, for example in Amabile's (1988; Amabile et al., 1996; Conti, Coon, & Amabile, 1996) influential componential model of creativity. Affect has also become a topic of intense interest to creativity researchers, including those studying organizations (Amabile et al., 2005; Russ, 1993). Supplementing the traditional focus of creativity literature on individual explanations, contextual and team-level accounts (both conceptual and empirical) of creativity in organizations have become more prevalent over the past decade or so (Madjar, Oldham, & Pratt, 2002; Shalley & Gilson, 2004). These studies have suggested that contextual factors do indeed impact creativity, either on their own or through their interaction with individual factors (Oldham & Cummings, 1996; Woodman et al., 1993).

The range of contextual factors examined includes: organizational climate, organizational structure, job design, individual autonomy, role expectations and goals, resource availability, reward structures, supervisory style, evaluation by others, and human resource policies (Madjar et al., 2002; Oldham & Cummings, 1996; Shalley & Gilson, 2004; Woodman et al., 1993). A common emphasis runs across most of these contextual accounts, however, despite the variety of factors examined. That is, a concern with how the contextual factor at hand influences the motivation of individuals to act creatively (Amabile et al., 1996; Oldham & Cummings, 1996;

Shalley & Gilson, 2004). Discerning contextual factors that “either encourage or discourage creativity” (Isaksen, Lauer, Ekvall, & Britz, 2000-2001) is the overriding concern. There is little emphasis on other mechanisms through which contextual factors may impact creativity in organizations, or on the processes that these may embody (Choi, 2004). Notable exceptions are the very few works that take an information-processing perspective and emphasize the impact of open, fluid job designs and organizational structures on encouraging communication with a wider variety of internal and external sources (e.g. Ancona & Caldwell, 1992; Kanter, 1988).

A variety of methodologies are used by contemporary organizational creativity researchers, including surveys (e.g. Amabile et al., 1996; Madjar et al., 2002; Oldham & Cummings, 1996), experiments (typically with students) (e.g. Conti et al., 1996; Shalley, 1991, 1995) and critical incident field analyses (e.g. Amabile et al., 1996; Isaksen et al., 2000-2001). While creativity researchers have typically focused on determining how creative an individual is, the dependent variable in organizational creativity research usually relates to an idea/s that participants generate in response to a specific stimulus, where idea volume is sometimes examined as a ‘productivity’ indicator (Shalley, 1995). More typically though, a consensual or supervisory rating is obtained of how novel and valuable (in combination) an idea or output is (Amabile et al., 1996; Madjar et al., 2002; Mumford, 2003; Oldham & Cummings, 1996).

Technological Search Literature: This stream of literature has its roots in the pioneering work of the Carnegie scholars, Herbert Simon and James March (Cyert & March, 1943; March & Simon, 1958; Nelson & Winter, 1982). Its primary concern is with the effect of ‘search scope’ (Katila & Ahuja, 2002) on the technological research productivity of large firms.

A central premise is that of ‘problemistic search’ (Cyert & March, 1963). Problemistic search posits that the search for solutions in organizations is triggered by problems, and takes a ‘bounded’ and ‘satisficing’ nature: initially starting with local search (anchored in the existing experience and knowledge bases of the firm) and only progressing to more distant search if a satisfactory local solution is not found.

Research in this stream has consistently demonstrated that broader search scope – i.e. more distant search – is associated with more innovation (e.g. Fleming & Sorenson, 2001, 2004; Katila, 2002; Katila & Ahuja, 2002; Laursen & Salter, 2006; Martin & Mitchell, 1998; Nerkar,

2003; Rosenkopf & Almeida, 2003; Rosenkopf & Nerkar, 2001; Stuart & Podolny, 1996). The primary processes through which increasing search distance is thought to be associated with more innovation are, according to Katila and Ahuja (2002): (1) enriching the firm's knowledge pool through the addition of new variations (solutions), and (2) enhancing the possibilities for recombinant search (Fleming, 2001; Nelson & Winter, 1982) that may result in the generation of novel solutions.

In practice, firms may engage in more distant search through a number of mechanisms (aside from the efforts of individual R&D staff or project teams), including: (1) foreign direct investment by multi-nationals in technologically advanced regions (Almeida, 1996); (2) inter-firm mobility of scientists and engineers (Rosenkopf & Almeida, 2003), and (3) collaborative arrangements with (or acquisitions of) other firms (Vermeulen & Barkema, 2001; Rothaermel & Deeds, 2004). Recent studies suggest that CVC investments may also enable more distant search (e.g. Keil, Maula, Schildt, & Zahra, 2008; Schildt, Maula, & Keil, 2005; Wadhwa & Kotha, 2006).

For corporate idea generation, the technological search literature suggests the importance of cognitive features of context: specifically, the importance of a breadth of stimuli to the generation of novelty. In particular, crossing geographic, technological, and temporal boundaries may be similarly important to the generation of new business ideas as to technological and product innovations. The predominant use of archival data (typically including patent citation analysis) has, however, restricted the types of stimuli that may be examined, and has also left-censored the stage of variations studied to those of a highly developed state (typically technological or product innovations). Furthermore, it has restricted the relevant empirical setting predominantly to that of R&D scientists and engineers in large firms in high-tech industries, allowing little examination of more dispersed innovation.

Additionally, while search rooted in the existing experiences and knowledge bases of the firm is a fundamental tenet of this literature stream, the role of experience itself (of either the firm or its relevant human agents) is seldom explored as part of the innovation equation. To date, the only studies we know to have modelled experience, are those of Katila (2002; Katila & Ahuja, 2002) which found how frequently the firm reuses its own innovation knowledge to be positively associated with product innovations.

1.4.2 Venturing via Focused Units in Large, Established Companies

We turn now to briefly reviewing the principal literatures that inform our understanding of the second research domain (viz. CE via focused corporate venture units). At present, relatively little of a systematic nature is known about the managerial and organizational determinants of successful CV unit performance. This is despite corporate venturing having been a widespread practice within large corporations since the 1960s, albeit with cycles of surging then waning interest (Chesbrough, 2000; Gompers & Lerner, 1998).

Multiple, inter-related factors contribute to this current hiatus in knowledge. Empirical obstacles to identifying populations of CV units abound given that they are seldom legally distinct structures and are hence not subject to the mandatory reporting standards applicable to firms. Data on CV unit performance is hard to come by, both by virtue of their afore-mentioned typical lack of a distinctive legal status from their parent firms, as well as company concerns over the strategic sensitivity of sharing corporate venturing outcome data. In addition, the ‘fragile’ nature of CV units, exposed to the winds of economic change, as well as to changes in company strategy and corporate political goodwill (Burgelman & Valikangas, 2005; Fast, 1979, 1981), results in a particularly unstable population of interest.

In all, literature on CV unit performance is probably best regarded as rather limited, inconclusive, and patchy in terms of empirical and theoretical rigour. On the latter point, it has also been demonstrably more oriented, till recently, towards practitioner rather than scholarly outlets and audiences⁹. The handful of relevant historical studies on CV unit performance (e.g. Fast, 1978; Rind, 1981; Sykes, 1990; Siegel, Siegel, & MacMillan., 1988) employed small samples, seldom conformed to consistent definitions of corporate venturing activities, and used self-reported performance measures almost exclusively.

More recently, however, there has been a surge in large sample research examining the (primarily) strategic consequences of CVC investments (e.g. Dushnitsky & Lenox, 2005, 2006; Keil, 2002, 2004; Maula et al., 2005, 2007; Schildt et al., 2005; Wadhwa & Kotha, 2006). This research suggests that many strategic benefits may accrue to companies with external venturing

⁹ Notable exceptions to this tendency do exist, however, such as the work of Burgelman (1983, 1991), which rigorously theorised the processes, using ecological metaphors, involved in progressing an entrepreneurial idea or project through an organization and, specifically, through various bureaucratic and political obstacles.

arms. It does not, through its reliance on archival data sources and its focus on external corporate venturing activities, cast much light on the role of organizational structures and practices in achieving such outcomes. Similarly, quantitative studies into the returns of portfolio firms conducted by Gompers and Lerner (1998), and Maula and colleagues (Maula & Murray, 2002; Maula, Autio, & Murray, 2005) suggest that both independent VC firms and external CV units contribute significantly to the value to portfolio firms. However, neither of these streams of research (cf. Dushnitsky, 2006, and Maula, 2007, for useful reviews) has specifically addressed - or been in a position to address - the role of internal organizational structures and practices to CV unit performance.

In order to understand CV unit forms and dynamics, and their implications for performance and survival, in more nuanced terms, we have chosen to draw on two established streams in organization and management literature. These are: (a) March's (1991) distinction between explorative and exploitative organizational learning modes, as well as related literatures on organizational ambidexterity (Duncan, 1976; Tushman & O'Reilly, 1996); and (b) literature on 'configurations' in organizations (Doty & Glick, 1994; Meyer, Tsui, & Hinings, 1993; Miller, 1986, 1996).

Exploration, Exploitation and Ambidexterity Literature: A recurring theme in organizational literatures is the tension organizations face between seemingly conflicting demands in their task environments. A pervasive tension is between the demands for exploration and exploitation (Gupta, Smith, & Shalley, 2006; March, 1991). The terms 'exploration' and 'exploitation' were introduced by March (1991) to identify two critical modes of organizational learning. Exploration involves "experimentation with new alternatives" with returns that are "uncertain, distant and often negative"; exploitation is the "refinement and extension of existing competencies, technologies and paradigms" with returns that are "positive, proximate, and predictable" (March, 1991: 85).

Managing exploration and exploitation presents a critical but highly challenging task for organizations. This task is critical as both exploration and exploitation are required for the successful performance of a firm: exploration is crucially linked to the organization's need for long-term adaptability to its environment; while exploitation is key to ensuring its short-term alignment therewith (Gibson & Birkinshaw, 2004). The challenge of effectively balancing

exploration and exploitation is that these learning modes are thought to entail significant trade-offs. Specifically, simultaneously achieving high levels of exploitation and exploration is difficult not only because of their competing calls on attention and resource allocation systems, but also due to the self-reinforcing nature of each mode of activity (Levinthal & March, 1993; Levitt & March, 1988). Due to positive feedback loops between experience with an activity and competence at performing that activity, organizations are likely to pursue the mode of learning in which they acquire more experience in a self-reinforcing cycle, such that the dominant mode of activity threatens to drive out the other mode.

Nevertheless, while acknowledging tensions between the learning modes of exploitation and exploration, some studies have suggested that it is indeed possible for organizations to become *ambidextrous*, i.e. capable of delivering on both activities at the same time (Gibson & Birkinshaw, 2004; He & Wong, 2004; Lubatkin, Simsek, Ling, & Veiga, 2006). Furthermore, these studies have demonstrated ambidexterity to be correlated with superior performance, especially in more challenging task environments (Jansen, Van Den Bosch, & Volberda, 2006). A rapidly growing literature is seeking to examine these rather controversial claims of the ambidexterity theorists (for an alternative viewpoint, proposing that exploration and exploitation are better managed through temporal sequencing, see Rothaermel & Deeds, 2004, and Siggelkow & Levinthal, 2003).

A particular focus of emerging organizational ambidexterity literature concerns the means by which an organization, or an organizational unit, may simultaneously pursue exploration and exploitation. At present, the means (or mechanisms) through which ambidexterity may be attained are only partially understood. One line of thought, and indeed the dominant view in the ambidexterity literature, suggests that exploration-oriented and exploitation-oriented activities are sufficiently different that they need to be kept apart by placing them in separate operating units (Benner & Tushman, 2003; Duncan, 1976; Galbraith, 1982; Gupta et al., 2006; Tushman & O'Reilly, 1996). An alternative perspective suggests that exploration and exploitation can coexist even within the same operating unit if sufficient care is given to the development of a conducive organization context (Danneels, 2002; Gibson & Birkinshaw, 2004; Holmqvist, 2004; Jansen et al., 2006).

Although widely used in the field of organization studies (Gupta et al., 2006), the concepts of exploration, exploitation and ambidexterity have received limited application in corporate venturing literature (see Keil et al., 2008, and Schildt et al., 2005, for recent exceptions examining the impact of investment relatedness on exploratory and exploitative innovation). This is possibly a consequence of the dominant view that holds CV units to be vehicles of exploration only. Indeed, from their historical inception, CV units have been viewed as a means to separate the ‘innovative’ from the ‘operating’ systems of large firms (Burgelman, 1983, 1984, 1985; Chesbrough, 2000; Galbraith, 1973, 1982). Accordingly, most studies have focused on the explorative role of CV units and their impact on exploration-oriented measures such as innovation and the early recognition of technological opportunities (Dushnitsky & Lenox, 2005, 2006; Rice et al., 2000; Wadhwa & Kotha, 2006).

We contend, to the contrary, that it is useful to conceptualise CV units in terms of both exploration and exploitation, as well as the ambidextrous combination of these two learning modes. In applying an ‘organizational learning’ lens to corporate venturing, we are also consistent with the theoretical direction advocated by a number of prominent entrepreneurship scholars (e.g. Dess et al., 2003; Ireland & Webb, 2007; Zahra, Nielsen, & Bogner, 1999). Accordingly, we seek through drawing on organizational learning constructs and arguments to both extend literature on corporate venturing, as well as to create and test propositions that challenge existing orthodoxy and help further new insights into this domain.

Configurations Literature: The study of organizational configurations is the second theoretical stream we draw on extensively in seeking to understand the performance and survival dynamics affecting CV units. The configurational approach to organizational analysis has its roots in the work of Miller and Friesen (1984) and Mintzberg (1979, 1983) and became well established during the 1990s (Gresov & Drazin, 1997; Miller, 1996). Essentially, organizational configurations are “any multidimensional constellation of conceptually distinct characteristics that commonly occur together” (Meyer et al., 1993:1175). Fiss (2007) describes the key features of a configurational approach to the study of organizations in the following manner:

In essence, a configurational approach suggests that organizations are best understood as clusters of interconnected structures and practices, rather than as modular or loosely coupled entities whose components can be understood in

isolation. Proponents of a configurational approach thus take a systemic and holistic view of organizations, where patterns or profiles rather than individual independent variables are related to an outcome such as performance.

Configuration theory breaks with linear organizational paradigms, rejecting notions of single causation and linear relationships (Fiss, 2007). It builds on certain of the principles of contingency theory (Burns & Stalker, 1961; Lawrence & Lorsch, 1967), namely: that there is no one best way to organize; that different organizational arrangements are valid for different strategic conditions; and that “increased effectiveness is attributed to the internal consistency, or fit, among the patterns of relevant contextual, structural and strategic factors” (Doty, Glick, & Huber, 1993: 1196). However, configuration theory extends, and indeed challenges, some of the more limiting assumptions of contingency theory. Three differences appear particularly noteworthy (Doty et al., 1993; Fiss, 2007; Meyer et al., 1993; Miller, 1986, 1996). First, configuration theory is concerned complex causality across multiple elements of strategy and organization, rather than with the more limited set of concepts that are typically the focus of contingency theory. Second, configuration theory assumes that the relationships between elements of a configuration are reciprocal rather than unidirectional. Third, the notion of equifinality – that there is more than one way to succeed in each type of setting - is a central component of configuration theory (Katz & Kahn, 1978; Gresov & Drazin, 1997).

The predictive power of configurations lies in the fact that relatively few alignments are likely to occur (Miller, 1986, 1996). In the words of Miller (1986: 235-236), “elements of strategy, structure and environment often coalesce or configure into *a manageable number of common, predictively useful types* that describe a large proportion of high-performing organizations” (emphasis added). This implies that a limited quantity of organizational ‘types’ may be identified in any setting. A number of factors, or imperatives (Miller, 1986, 1987), in combination, drive the formation and persistence of these small sets of common configurations of elements. In particular, Darwinian selection mechanisms weed out poorly performing organizational forms, and emerging forms are imitated by others through both mimetic and normative isomorphic processes (DiMaggio & Powell, 1983). Managerial selection mechanisms also constrain the range of organizational forms occurring in practice (Drazin & Van de Ven, 1985). The greater the strength of these selection regimes, the more restricted the range of

organizational forms one can expect to find (Drazin & Van de Ven, 1985). Strategy and structure, too, serve as mutually constraining influences: “given a particular strategy there are only a limited number of suitable structures and vice versa” (Miller, 1986: 234). Once established, these configurations tend to adhere relatively unchanged for substantial periods.

While well established in other areas of organization research, configurational logic has not, to the best of our knowledge, been applied to corporate venturing¹⁰. A configurations approach, however, has demonstrated its utility in empirical tests examining the linkages between organizational contexts, structures and strategies, and performance outcomes (see Ketchen et al., 1997, for meta-analytic findings). From a theoretical perspective too, configuration logic seems exceptionally well suited¹¹ to probing the complex context – with its intricate webs of relationships and diversity of objectives - of multiple CV unit types.

1.5 Overview of Chapters

This section provides a brief overview of each of the chapters that follow. The structure of the dissertation is illustrated in Figure 1-3.

1.5.1 Chapters 2 and 3: Idea Generation via Dispersed CE

The brief review above of the entrepreneurship opportunity recognition, technological search and organizational creativity streams of literature indicates that none currently focuses directly on the corporate recognition of entrepreneurial opportunities. Each has, however, made considerable inroads into understanding at least one central construct, or relationship, germane to this topic. We hence contend that there is considerable scope for the development of a theory of corporate opportunity recognition that draws on, and extends, the work of these streams. Chapters 2 and 3 endeavour to take initial steps in this direction.

¹⁰ Although it warrants mention that typologies that do not follow a configurational approach are, however, not uncommon within the domain (e.g. Burgelman, 1984; Chesbrough, 2002; Miles & Covin, 2002).

¹¹ Refer to Harms, Kraus and Reschke (2007) for a discussion and review of existing literature regarding the potential value of a configurations approach in the independent venturing setting.

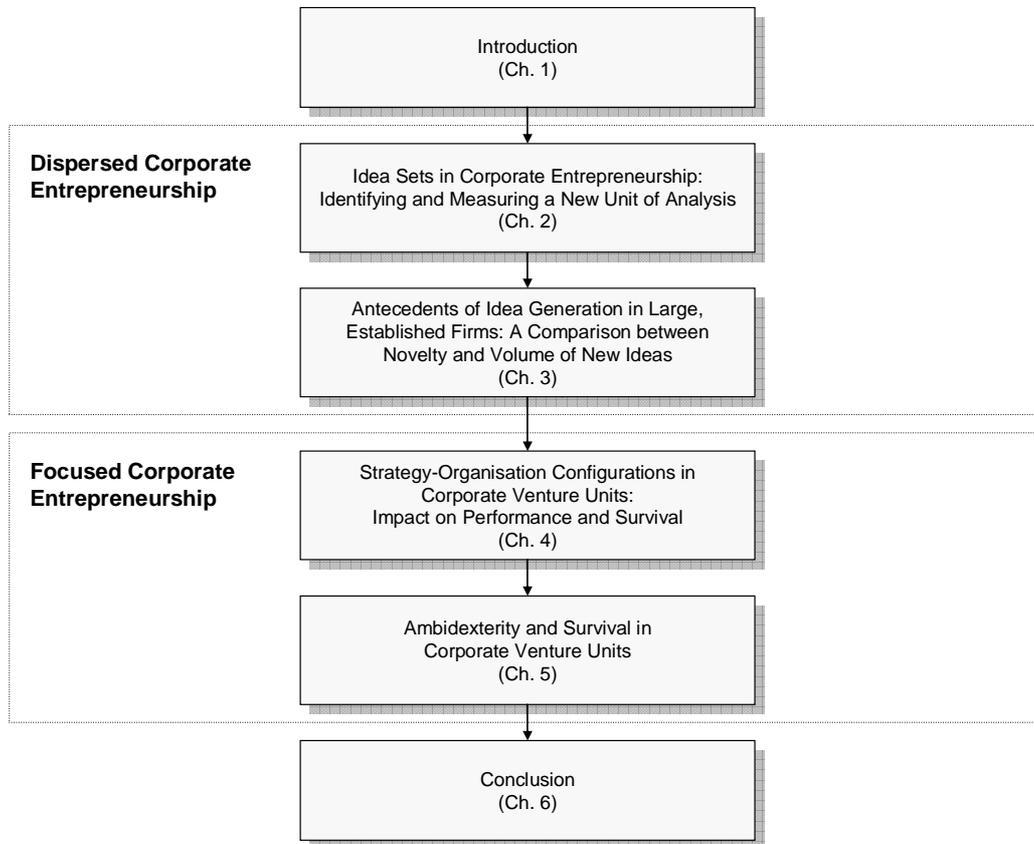


Figure 1-3 Structure of the Dissertation

Chapter 2 (Idea Sets in Corporate Entrepreneurship: Identifying and Measuring a New Unit of Analysis) proposes ‘idea sets’ as a new unit of analysis through which the antecedents and outcomes of entrepreneurial opportunity recognition may be more fully understood in corporate contexts. It identifies a number of dimensions along which one person’s idea set may be compared with that of another person. These include: the novelty, volume, content, stage of development, strategic value bases, and composite knowledge configuration of ideas within their idea set. In addition to outlining idea sets conceptually, Chapter 2 describes a set of questionnaire-based measures through which they may be captured empirically. Initial multiphase testing thereof provides good evidence for the construct, convergent and divergent validities of our idea set instrument.

Drawing on March and Simon’s (1958) psychological set concept, idea sets are defined as the complete stock of new business ideas – ranging from the ‘spark’ of an idea to fully

commercialised ideas - a person is considering at any given time. Our use of the language and nomology of 'ideas', rather than 'entrepreneurial opportunities', reflects our lack of adherence to an objectivist paradigm in respect of our phenomenon of interest (refer to Section 1.4.1 'Dispersed Opportunity Recognition in Large, Established Companies' regarding the objectivist-subjectivist debate on the nature of opportunity in mainstream entrepreneurship literature). It is consistent too with the long established tradition of creativity research: a domain which, through its solid foundation in psychology, is often thought to hold important lessons for the discipline of entrepreneurship (cf. Dimov, 2007). Accordingly, we do not prescribe to the view of opportunities as a given "set of possibilities which is exogenous to any decision made by the entrepreneur" (Casson & Wadeson, 2007: 289). Rather, we focus on individual cognition as the 'seat' (or locus) of perceived opportunity, without making strong assumptions regarding the extent to which such cognitions correspond to any external 'reality'. Ideas are, then, the artefacts of the cognitive processes concerning opportunity emergence.

The introduction of the idea set unit of analysis also enables a far more comprehensive 'picture' to be built up of the ventures or initiatives a given person may be thinking about at any time, which can then be tracked over time to examine the factors impacting which ideas are pursued further (or not). In addition, the systematic comparison of different individuals' individual and contextual conditions, against their idea set characteristics, facilitates a far more rigorous understanding of which entrepreneurial initiatives ('opportunities') they 'see' than does the dominant empirical and theoretical focus on single (and historic) person-opportunity (Shane, 2003) nexuses. In these respects, the idea set unit of analysis provides a critical 'bridge' (or missing link) between antecedents and entrepreneurial behavior, illuminating what was previously somewhat of a 'black box' in entrepreneurship (and CE) literature.

In particular, the idea set construct and its associated measures help to overcome the following limitations (outlined in Section 1.4.1) which pervade extant opportunity recognition research in the field of entrepreneurship. Such limitations include: (1) very limited differentiation along pertinent dimensions between opportunities identified by different persons; (2) sample selection biases towards investigating only 'exploited' opportunities via the dominant utilisation of business founding as a proxy for opportunity recognition, and associated problems of retrospective and survival biases influencing findings; or, alternatively, (3) the limited ability

to address contextual antecedents of opportunity recognition when quasi-experimental methods are used to tap opportunity recognition; and (4) the lack of adaptation of the entrepreneurial opportunity construct to the corporate context, for example in terms of the content of opportunities. All these limitations critically hinder the advancement of knowledge regarding what has come to be seen as a defining concern of entrepreneurship – i.e. “Why do some people and not others discover particular entrepreneurial opportunities?” (Shane & Venkataraman, 2000: 221). This chapter makes conceptual and methodological contributions aimed at enhancing scholarly efforts to answer this key question in the corporate context.

Chapter 3 (Antecedents of Idea Generation in Large, Established Firms: A Comparison between Novelty and Volume of New Ideas) demonstrates the utility of the idea set construct and instrument to better understanding the antecedents of corporate idea generation.

Despite probably being the most widely used dimensions on which innovations or ideas are described in extant literature, idea novelty and volume are seldom investigated together (Shalley, 1995; Shepherd & De Tienne, 2005; and Ucbasaran, Westhead, & Wright, 2008, presenting rare exceptions). Our primary survey data from 388 knowledge workers in three large multinational companies allows us to jointly examine these two features of individuals’ idea sets. Furthermore, it enables us to examine a more comprehensive set of individual knowledge, contextual stimuli and cognitive process antecedents than has occurred to date.

In addition to being probably the most widely used (but seldom simultaneously investigated) dimensions along which ideas or innovations are characterised, and hence the dimensions along which a contribution is likely to have the greatest impact at present, an additional theoretical rationale informed our focus on these two dimensions in this Chapter. Specifically, technological search and organizational creativity literatures present an intriguing disconnect which we believe the joint examination of novelty and volume characteristics can shed light on. That is, technological search literature has, on the one hand, focused on explaining the volume of innovations generated by organizations, via the established theoretical tradition of recombinant search processes. On the other hand, organizational creativity literature (and creativity literature, more generally) has primarily concentrated on the novelty (combined with utility) of innovations, positing that divergent, more ‘creative’ processes inform the more

innovative of these. By integrating consideration of both the volume and novelty dimensions of ideas, the roles of the respective process theories may be tested and, we posit, united.

We thus develop and test a set of hypotheses regarding commonalities and differences between the contextual and knowledge-based antecedents of idea set novelty (i.e. the novelty of a person's ideas at a given time) and idea set volume (i.e. the quantity of ideas a person is considering at a given time). We also propose that distinctive knowledge processing mechanisms underlie the generation of many ideas versus novel ideas in corporate settings. In respect of the differing process theories advocated by the technological search and creativity traditions, we contend that, on the one hand, a knowledge combination process accounts for idea set volume. This is akin to the combinatorial search (or 'recombinant search') (Fleming, 2001; Nelson & Winter, 1982; Schumpeter, 1939) processes proposed by technological search theorists. On the other hand, however, we argue that more creative, knowledge transformation processes account better for idea set novelty.

Our findings are, for the most part, supportive of our arguments that distinctive antecedents account for the novelty and volume of entrepreneurial ideas generated by corporate knowledge workers. In particular, we found that possessing a broad knowledge base was associated more with the volume of ideas generated than with their novelty, whilst exposure to broad and deep stimuli were both more strongly related to the novelty of ideas. Furthermore, as posited, different knowledge processes help account for idea set novelty and volume. In this regard, idea set novelty appears to involve cognitive processes of knowledge transformation (Koestler, 1942; Mumford & Gustafson, 1988), triggered by equivocal thought processes associated with diverse contextual stimuli. Idea set volume, to the contrary, while still facilitated by broad exposure to stimuli, was not triggered by equivocality and was rather explained by knowledge combination (Fleming, 2001; Katila & Ahuja, 2002; Nelson & Winter, 1982; Schumpeter, 1934) processes.

In all, these findings highlight the value of integrating and extending the constructs and propositions of extant literature streams in order to facilitate new understandings of corporate idea generation. Specifically, the attention and information processing (Ocasio, 1997; March &

Simon, 1958; Simon, 1947, 1979, 1997) framework we adopt in Chapter 3 integrates and extends the conceptualisation of a person-context-idea nexus¹² in corporate idea generation. Central to this endeavour is our attempt to move beyond the prevailing ‘single opportunity’ focus of entrepreneurial opportunity recognition literature and to develop a more systematic treatment of the idea construct, which more fully recognizes its multi-dimensional nature. Our findings suggest this step to indeed be a valuable one in advancing knowledge in our first research domain (viz. dispersed opportunity recognition in corporate settings).

1.5.2 Chapters 4 and 5: CE via Focused Corporate Venture Units

As discussed earlier (in Section 1.4.2), historical research on CV units has typically been of case study or small sample nature little suited to theory testing, and has frequently been geared towards a practitioner rather than scholarly audience. As a consequence, relatively little of a systematic nature is known about the managerial and organizational determinants of successful CV unit performance, and there are few validated theories that have been demonstrated to apply in this context.

In Chapters 4 and 5, utilising the unique dataset described in Section 1.3, we import constructs and theories from the literatures on organizational configurations (Doty & Glick, 1984; Meyer et al., 1993; Miller, 1986, 1996), exploration and exploitation (March, 1991), and organizational ambidexterity (Duncan, 1976; Tushman & O’Reilly, 1996), to build and test models of CV unit performance and survival.

Chapter 4 (Strategy-Organization Configurations in Corporate Venture Units: Impact on Performance and Survival) employs configurational theory and methods (Doty & Glick, 1994; Meyer et al., 1993; Miller, 1986, 1996) to investigate whether different types of CV units demonstrate differences in their performance and survival rates.

We categorize CV units based on two dimensions that characterise their strategic profile:
(a) whether their new venture ideas mainly lie inside or outside the formal boundaries of the firm

¹² Shane (2003) posits an ‘individual-opportunity’ nexus in his general theory of entrepreneurship. While we employ a more subjectivist approach than his, which asserts a nexus between an objective opportunity and a person with the ‘right’ characteristics (especially knowledge profile) necessary to recognize it as such, we also propose a nexus concept. We extend this concept, however, to include the impact of contextual factors, and view it as the interaction between contextual factors and individual factors in influencing idea sets.

(i.e. the locus of opportunity) (Sharma & Chrisman, 1999), and (b) whether the venture unit focuses primarily on exploring to develop new assets and capabilities for its parent firm, or whether it focuses on exploiting the existing assets and capabilities of the parent firm (i.e. the strategic logic of the venture unit) (March, 1991). Hence, we identify four types of CV unit:

- (1) Internal explorer units, which invest in opportunities that arise inside the parent firm and actively nurture and develop these so that, over time, they become sources of growth for the firm.
- (2) Internal exploiter units, which attempt to monetize the existing assets (such as patents, technologies, raw ideas and managerial talent) of the parent firm within a short time frame, frequently by spinning them out as new businesses.
- (3) External explorer units, which invest in external companies (typically independent start-ups) predicted to have growth potential in domains anticipated to be of future strategic importance to the parent firm.
- (4) External exploiter units, which invest in external companies with a view to generating financial returns through leveraging the existing assets of the parent firm.

Applying a configurational logic, we argue that the structures and systems used by venture units will be a function of their strategic orientation, and that their performance will be higher when their internal elements are aligned. Consistent with these propositions, we find that each of the four venture unit types is associated with a unique organizational profile – that is, with a distinctive network of relationships, venturing activities, and management systems.

Regarding our research question of whether the different venture unit types perform differently and have different survival rates, we find that distinctive dynamics are at play for performance and survival. For the performance of CV units, we find that the fit of the venture unit's strategic profile and, particularly, the various elements of its organizational profile, are critical to its short- to medium-term performance. In other words, no single venture unit type performs best, even when examined across a stringent performance definition which includes technological, financial as well as entrepreneurial capability dimensions. Rather, the better aligned the elements of its strategic profile and (most importantly) the elements of its

organizational profile, the better the performance of the venture unit, irrespective of its type. Hence, configurational logic appears appropriate to understanding the performance of CV units.

On the other hand, for the survival of CV units, the type of the unit was found to be critical rather than fit with any ideal strategic or organizational profile. Specifically, CV units that are geared towards the exploitation of parent firm assets and capabilities – i.e. the internal exploiter and external exploiter venture types - tend to survive longer. Units that focus on exploratory roles are at increased risk of early termination, regardless of their performance track-record. This might be attributed to exploitation-oriented activities tending to drive out exploration-oriented activities (Levinthal & March, 1993) - both because exploration-oriented activities are more uncertain in their outputs, and because they operate on a longer time horizon than exploitation-oriented activities. Hence, corporate executives may find the performance of exploration-oriented units more difficult to assess objectively in the short-term than that of their exploitation-oriented counterparts.

In sum then, the unique contribution of this chapter is to apply March's (1991) distinction between exploratory and exploitative learning, as well as the logic and methods of organizational configurations analysis (both uniquely, we believe), to build a more nuanced model of CV unit performance and survival.

Chapter 5 (Ambidexterity and Survival in Corporate Venture Units) explores in yet more detail than in the preceding chapter the roles that exploration and exploitation (March, 1991) may play in the survival of CV units. We depart once again, as per the previous chapter, from the dominant view of CV units as exclusively exploratory.

Drawing in particular on the burgeoning literature on organizational ambidexterity (Duncan, 1976; Gibson & Birkinshaw, 2004; Gupta et al., 2006; Tushman & O'Reilly, 1996), we argue that the dominant view of CV units as vehicles for exploration (Burgelman, 1983; Galbraith, 1982) is too simplistic. Instead, we propose that successful CV units are likely to be ambidextrous, i.e. to simultaneously engage in both exploration and exploitation. We look to social capital theory (Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998) to argue that ambidexterity may be created through a relational context that draws on relationships with three sets of actors: senior corporate executives, other business units, and members of the venture

capital community. Ambidexterity then serves to legitimate the activities of CV units, making them both more comprehensible (cognitively legitimate) and acceptable (socio-politically legitimate) to key internal and external constituencies. Thereby ambidexterity enhances the chances of CV unit survival.

We test and find support for these arguments. There are two key findings. First, ambidextrous CV units (i.e. those focusing simultaneously on using and building capabilities) exhibit particular patterns of relationships with three sets of actors – senior executives in the parent company, other business units in the parent company, and members of the venture capital community. Second, venture units high on both exploitation (using existing corporate capabilities) and exploration (building new capabilities) have an increased likelihood of survival.

In addition to its implications for research and practice on corporate venturing, the chapter has novel implications for ambidexterity scholarship: indicating, potentially rather controversially, that ambidexterity may aid survival not only through improving long-term performance, but also through engendering perceptions of legitimacy amongst key constituencies. Furthermore, relational antecedents of ‘contextual ambidexterity’ (i.e. the integration of exploration and exploitation within an organizational unit; Gibson & Birkinshaw, 2004) are proposed and elaborated in the chapter.

1.6 Structure of the Dissertation

The rest of the dissertation is structured as follows: Chapters 2 and 3 examine dispersed idea generation in corporations, with Chapter 2 introducing and operationalizing the ‘idea set’ as a new unit of analysis through which to understand entrepreneurial idea generation in corporate settings, and Chapter 3 demonstrating the utility of this unit of analysis to understanding commonalities and differences in the origins of diverse entrepreneurial ideas. Chapters 4 and 5 address corporate venturing via focused units, with Chapter 4 proposing and testing a configurational typology of CV units, and Chapter 5 demonstrating the value of ambidextrous resource utilisation and capability building by CV units to their survival. Chapter 6 concludes the dissertation by providing an overview of its key contributions, identifying its major limitations, and making recommendations for future research.

CHAPTER II

IDEA SETS IN CORPORATE ENTREPRENEURSHIP:

IDENTIFYING AND MEASURING A NEW UNIT OF ANALYSIS

2.1 Introduction

Despite its prominence within emerging scholarship on entrepreneurship, research on the recognition of entrepreneurial opportunities is still fairly embryonic (Shane, 2000, 2003; Shane & Venkataraman, 2000). The more typical focus of extant management literature has been on the exploitation of sources of ‘variation’ (Campbell, 1969; Staw, 1990). This is particularly true of opportunity recognition in corporate contexts.

One reason, we contend, for this gap in empirical research on entrepreneurial opportunity recognition is the difficulty in defining (and measuring) an appropriate unit of analysis via which to study opportunities. With a few recent exceptions (cf. Ardichvili, Cardozo, & Ray, 2003; Sarasvathy, Dew, Velamuri, & Venkataraman, 2003), entrepreneurship literature has regarded opportunities in a largely undifferentiated manner, giving little attention to distinguishing between different features of opportunities. Empirical methods reflect this approach: most use business formation as a historical proxy for opportunity recognition, attempting to draw near-universalistic conclusions regarding opportunity recognition from populations of business foundings (see Dimov, 2004, and Gaglio, 2004, for reviews). In addition to important problems such as retrospective bias in founders’ accounts of business formation and survival bias in the sampling of new businesses, such approaches are likely to suffer significantly from sample selection bias. Simply stated, how do we know that founded businesses constitute a *representative* sample of available (or perceived) opportunities?

This is an issue that has received surprisingly little attention to date despite good reasons for believing that the subset of exploited opportunities may differ in systematic ways from those

opportunities available (from an objectivist perspective) or perceived (from a more subjectivist perspective) (McMullen & Shepherd, 2006). Exploited opportunities may indeed differ from unexploited ideas along dimensions such as their novelty, scale and value logic (Czernich, 2004). Research on the role of human capital across different phases of an entrepreneurial initiative (Corbett, 2007; Davidsson & Honig, 2003; Dimov & Shepherd, 2005) suggests that their origins, in turn, may differ systematically too.

In addition, the focus of opportunity recognition theory and literature has to date largely been restricted to the setting of independent ventures; the phenomenon of opportunity recognition in large, established firms remains markedly under-explored. This is somewhat surprising given the role that venture ideas originating - in one form or another - from large firms may account for in the evolution of industries and markets (Klepper, 2001).

Hence, a number of fairly fundamental issues currently dog the systematic study of the recognition of entrepreneurial opportunities in large, established corporations. Specifically: (1) the opportunity unit of analysis appears underdeveloped in terms of its dimensionality; (2) dominant empirical approaches to entrepreneurial opportunity recognition – via associating opportunity recognition with historic business founding - are prone to retrospective biases, survival bias, and to misrepresenting (or presenting, at least, a limited picture of) the opportunities identified by individuals; and (3) the extremely limited grounding of opportunity recognition literature within a corporate context. This chapter attempts to address these important limitations of extant approaches to entrepreneurial opportunities in corporate settings. In so doing, it contributes an important *‘theoretical bridge’* between antecedents of opportunity recognition and entrepreneurial actions to pursue (or not) a new corporate venture.

We take a subjectivist approach to opportunities, identifying and then operationalizing a more comprehensive idea-based unit of analysis through which opportunities may be conceptualised and studied empirically. We propose ‘idea sets’ as a new unit of analysis via which entrepreneurial opportunity perception may be more fully understood in corporate contexts. Idea sets are defined as the complete stock of new business ideas – ranging from the ‘spark’ of an idea to fully commercialised ideas - a person is considering at any given time. Drawing on, in addition to recent entrepreneurship literature on entrepreneurial opportunities, a range of innovation and organizational creativity literatures (e.g. Drazin, Glynn, & Kazanjian,

1999; Mumford, 2003; Shalley & Gilson, 2004), a number of generic dimensions are identified along which one person's idea set may be compared with that of another person. By characterizing idea sets along a number of dimensions, we contend that new insights into, and a more comprehensive understanding of, corporate idea generation is enabled.

In terms of operationalization, multi-phase and multi-source field data was collected to develop and measure the idea set construct (and its dimensions). This process comprised: (1) in-depth exploratory interviews with 20 knowledge workers in a multinational FMCG company; (2) two rounds of pilot questionnaire development and testing; (3) survey data from 388 knowledge workers across three multinational companies in diverse sectors (supplemented by supervisory data); and (4) 12-month case studies of 22 individuals from two of the companies that participated in the survey. These processes were designed to ensure adequate construct validity of the idea set construct, while CFA and other psychometric analyses demonstrate the convergent and divergent validities of our measures. Furthermore, predictive validity is demonstrated through somewhat different patterns of antecedents accounting for the idea set dimensions of idea novelty and volume. This issue is to be addressed further in the next chapter (Chapter 3).

This chapter is structured as follows: First, we briefly review how entrepreneurial opportunities are operationalized in existing entrepreneurial opportunity recognition literature. Second, we then propose our 'idea set' construct as a potentially fruitful unit of analysis, and discuss a range of dimensions along which new business ideas and idea sets can be meaningfully classified. Third, we describe the development and properties of our instrument to capture idea sets within large, established firms. In conclusion, we discuss a number of theoretical and practical implications of the idea set construct and instrument.

2.2 New Business Ideas in Extant Literature

Table 2-1 presents an overview of three dominant contemporary approaches to researching entrepreneurial opportunities in entrepreneurial opportunity recognition literature (refer to Section 1.4.1 of the previous chapter for a fuller discussion of the mainstream entrepreneurship literature on opportunity recognition, as well as other literatures we drew on in developing our ideas for this chapter).

This is a burgeoning research stream although relatively little is yet published in peer-reviewed journals (Corbett, 2007; Dimov, 2004; Gaglio, 2004; Ireland & Webb, 2007). A typical focus – consistent with the priorities of prominent entrepreneurship scholars who have defined opportunity recognition, along with opportunity exploitation, as a defining feature of the entrepreneurship discipline (Shane, 2000, 2003; Shane & Venkataraman, 2000; Venkataraman, 1997) - is on issues relating to who recognizes what entrepreneurial opportunities, and how this occurs. Furthermore, the setting of this research in the independent venturing context is ubiquitous. While each approach has made useful strides in understanding the complex phenomenon of entrepreneurial opportunity recognition, we contend that a more comprehensive, dimensionalized perspective on entrepreneurial opportunities, contextualized to corporate settings, would considerably help advance understanding of corporate opportunity recognition. Before we advocate our ‘idea set’ unit of analysis, we briefly discuss the respective foci and limitations of the common empirical methods employed in contemporary entrepreneurship opportunity research.

Technique	Examples	Sample	Operationalization of Opportunity
Interviews or verbal protocol analyses	e.g. Sarasvathy et al. (1998); Ardichvili & Cardozo (2000); Davidsson & Honig (2003) ¹ ; Ames & Runco (2005); Gregoire et al. (2006)	Usually business founders	Opportunity recognition assumed via business founding rather than directly examined. Measures of opportunity ‘success’ sometimes incorporated into analysis, else taken into consideration in sample selection.
Survey	e.g. Ucbasaran et al. (2003); Baron & Ensley (2006); Ozgen & Baron (2007); Ucbasaran et al. (2008)	Business founders	Opportunity recognition assumed via business founding. A variety of approaches utilised to measure opportunities, including: examining the motivation behind specific business foundings (Baron & Ensley, 2003); using measures of generic opportunity recognition ability (Ozgen & Baron, 2007); and examining a founder’s history of businesses started (Ucbasaran et al., 2008).
Quasi-experiments	e.g. Dimov (2003, 2007); Shepherd & De Tienne (2005); Corbett (2007) ²	Usually business students	Number of opportunities identified is counted. In some studies, the novelty the ideas generated by respondents is also assessed by expert raters.

Table 2-1 Synopsis of Approaches to New Business Ideas in Extant Literature

Notes:

¹ Davidsson & Honig (2003) conducted interviews with nascent entrepreneurs over an 18-month period.

² Corbett sampled a range of technology professionals including “founders, owners, top management team members, engineers and researchers of technology-based firms” (2007: 105).

Most frequently opportunity recognition researchers have used business formation as a historical proxy for opportunity recognition having occurred. This is despite different sets of factors appearing to influence opportunity exploitation versus opportunity recognition (Corbett, 2007; Davidsson & Honig, 2003; Dimov & Shepherd, 2005; McMullen & Shepherd, 2006). In addition, one opportunity exploited by an individual is not necessarily characteristic of the other opportunities they have considered and/or exploited. Two empirical techniques (or some combination of the two) characterise this approach: (a) business founders are interviewed (increasingly employing sophisticated verbal protocol analyses, or similar, to examine the cognitive processes underlying opportunity recognition) (e.g. Ames & Runco, 2006; Ardichvili & Cardozo, 2000; Gregoire, Barr, & Shepherd, 2006; Sarasvathy, Simon, & Lave, 1998); or (b) business founders are surveyed, using a range of measures (e.g. Baron & Ensley, 2006; Ozgen & Baron, 2007; Ucbasaran et al., 2003, 2008). In both approaches, little emphasis is given to measuring or dimensionalizing the entrepreneurial opportunity construct per se.

A more recent addition to entrepreneurial opportunity research has been the use of quasi-experimental procedures (e.g. Corbett, 2007; Dimov, 2003, 2007; Shepherd & De Tienne, 2005). These typically employ scenarios, asking respondents (usually business students) to generate ideas regarding how a specific market could be better served or a given technology applied in industry. Via this methodology, researchers have been able to examine how factors such as specific human capital and individual learning styles impact counts of ideas generated. Expert rater assessments of the novelty of such ideas have also proved tractable empirically using these quasi-experimental methods (Shepherd & De Tienne, 2005). Thus, scholars in this stream have been able to overcome the confounding of opportunity recognition with opportunity pursuit as occurs in the 'business founder' opportunity recognition approaches, as well as the survival bias inherent in examining businesses still in operation. These methods also make feasible the assessment of a broader range of ideas generated by an individual. Conversely, however, they do not enable discrimination between ideas ultimately pursued, rejected or abandoned (after attempts at pursuit) by persons. Furthermore, as per all experimental research, they raise issues regarding the generalizability of their findings to non-experimental, 'everyday' settings.

In all, existing methods display a number of systematic limitations regarding the insights they can provide on corporate opportunity recognition. We outline our proposal for a new unit

of analysis that we believe would help advance empirical research and theory on corporate opportunity recognition in the remainder of the chapter.

2.3 Conceptualizing New Business Ideas and Idea Sets

2.3.1 Defining New Business Ideas and Idea Sets

The approach we propose is to introduce the concept of ‘individual new business idea sets’ (or just ‘*idea sets*’ hereafter) as a new unit of analysis for corporate opportunity recognition.

We define an idea set as:

the complete stock of new business ideas an individual has accessible within his or her memory at any given time

where a new business idea refers to:

the prospect of applying new knowledge, or applying knowledge in a novel manner, to one or more of the dimensions of a business offering – for example, to its product/service, market, technology, production methods or business model – such that a new source of economic gain may be realized.

The idea set construct includes ideas that are well developed as well as ideas that are thought to represent just the initial ‘spark’ of possibility. We propose that the idea set concept will enable a more comprehensive analysis of the new business ideas an individual generates, with comparisons of the composition of one person’s idea set versus another person’s providing a means through which to partial out various individual and contextual antecedents of corporate idea generation. The usage of the term ‘set’ parallels March and Simon’s (1958) psychological set concept, whereby an individual’s psychological set refers to an individual’s memory content at a given time, whether currently evoked or unevoked by environmental stimuli. Over time, new ideas will enter the idea set whilst others will be discarded (consciously rejected as infeasible and/or undesirable) or will fade from the set (as an individual’s attention is shifted over time towards different commercial stimuli). Multiple factors will influence the rate of flow of ideas within an individual’s idea set. Cognitive psychology research examining memory and attention suggests these to be extremely complex, including such factors as: how deeply idea

scripts were originally encoded by an individual, the context in which they were encoded, systems of individual attention allocation across competing stimuli, and the effectiveness of retrieval systems in accessing stored ideas (again, influenced by factors such as the degree of matching between encoding and retrieval strategies, and between the contexts in which the respective cognitive processes occur) (cf. Best, 1995; Medin, Ross, & Markman, 2002; Morrison, 2005; Neumann, 1996; Styles, 2006). Within the corporate setting, individual encoding, attentional and retrieval processes will be subject too to the influences of established organizational attention structures - defined by Ocasio (1997: 195) as “the social, economic, and cultural structures that govern the allocation of time, effort and attentional focus of organizational decision-makers in their decision-making activities” - in which corporate knowledge workers are embedded. Accordingly, extant research within cognitive psychology and organization theory give us little guidance on likely periods of idea retention¹³ or rates of idea flow within idea sets. Hence, idea sets need to be understood as highly complex phenomenon, requiring substantial future theory development and empirical investigation. The ideas we offer here should thus be regarded as tentative and provisional.

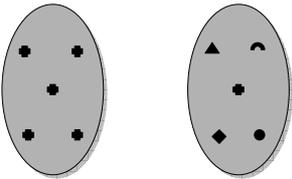
Congruent with many definitions of opportunity in the entrepreneurship literature (Casson, 1990; Gaglio, 2004; Rumelt, 1987), our definition of new business ideas incorporates an element of novelty. It, following Schumpeter’s (1934, 1942) ‘new combinations’ perspective, identifies wider sources of opportunity than the common focus in scholarly discussions of opportunity or creative innovations on just new product or market elements (Bhave, 1994; Churchill & Muzyka, 1994; Shane, 2003). Epistemologically, this conceptualisation is grounded within a knowledge-based perspective on innovation (Kazanjian, Drazin, & Glynn, 2002), where the elements informing ideas may be conceived as residing in diverse fields of knowledge concerning (in broad) products, markets, technologies, production methods and business models.

¹³ Drawing general conclusions regarding temporal characteristics of idea sets from the cognitive psychology literature is made particularly difficult by the dominant use of experiments concentrating on short term attention and memory processes (viz. a few seconds or minutes) for new information. Experimental studies extending beyond a number of hours are extremely rare in this domain.

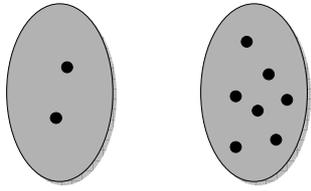
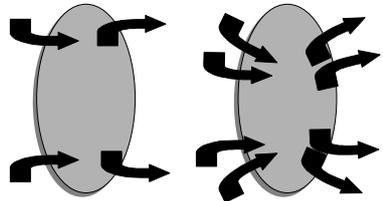
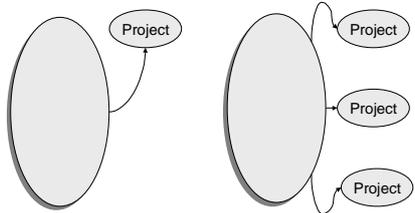
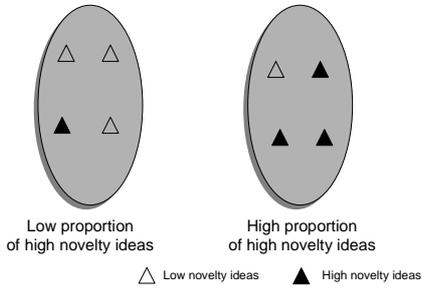
2.3.2 Idea Set Dimensions

We characterize idea sets along five primary dimensions¹⁴. These relate to the: content, volume, stage of development, strategic logic and novelty (outcome- and process-based novelty) of ideas within a person’s idea set.

The four dimensions relating to content, volume, stage of development, and outcome-based novelty were suggested by the literature reviewed earlier in which each is modelled either implicitly or explicitly within at least one research stream (refer to Table 1-1 in the previous chapter). The more unusual idea set dimensions pertain to their strategic logic and to their composite knowledge configuration. The former is congruent with a view of entrepreneurial initiative as being primarily concerned with value creating new ideas (Gaglio, 2004; Moran & Ghoshal, 1999), while the latter adopts (and extends) key concepts in recent entrepreneurial opportunity typologies developed by Ardichvili et al. (2003) and Sarasvathy et al. (2003). Using these five dimensions to characterize idea sets enables a range of important but little explored features of idea generation to be theorized and investigated empirically. By way of illustration, Figure 2-1 outlines a number of possible comparisons across features of idea sets.

Dimension	Graphic Depiction
<p>Idea set diversity – diversity along either:</p> <ul style="list-style-type: none"> • The content of ideas • The value logic (i.e. value creation versus value appropriation) of ideas. 	 <p style="text-align: center;"> Focused Ideas Diverse Ideas </p>

¹⁴ In our empirical research, we also attempt to measure the economic magnitude of new ideas. We do so as a post hoc characteristic of ideas and idea sets, given the indeterminacy (Knight, 1964) of many ideas prior to their exposure to external selection mechanisms.

Dimension	Graphic Depiction
Idea set volume	 <p>Few Ideas</p> <p>Many Ideas</p>
Idea set dynamism	 <p>Low idea flow rate</p> <p>High idea flow rate</p>
Idea set actualisation i.e. diversity in the degree to which ideas are acted upon	 <p>Low initiative-idea ratio</p> <p>High initiative-idea ratio</p>
Idea set novelty	 <p>Low proportion of high novelty ideas</p> <p>High proportion of high novelty ideas</p> <p> Low novelty ideas High novelty ideas </p>

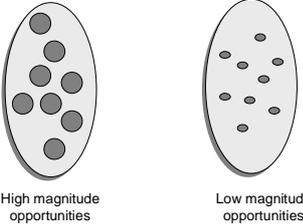
Dimension	Graphic Depiction
Idea set scale	

Figure 2-1 Idea Set Characteristics

(1) *Content of ideas:* The ‘content’ of a new business idea refers to the dimension, or dimensions, of a business concept along which it introduces novelty to a business concept. Thus, an opportunity may be categorised as a product opportunity, a market opportunity, a technology opportunity, a production methods opportunity, a business model opportunity, and so on, or some combination of these. Surprisingly, the content of ideas is seldom referred to in either entrepreneurship opportunity recognition or organizational creativity literatures.

In identifying the content areas applicable to new business ideas, we follow Schumpeter’s (1934) ‘new combinations’ perspective on entrepreneurship which views innovation as residing in the combination of “the new combinations of existing stock of the factors of production.” This approach – whereby Schumpeter identified new or changed goods, new methods of production, new markets, new sources of supply, and new organizations of production, as loci of innovation - identifies wider sources of opportunity than the more common focus on either new product or new market elements (Bhave, 1994; Churchill & Muzyka, 1994; Shane, 2003).

An array of business concept dimensions hence exists along which an idea can innovate: potentially the greater the number of content dimensions along which an idea innovates, the greater the innovativeness of the associated business offering. We capture this concept by proposing that idea sets can be discriminated both in terms of (1) the dominant content domain of ideas within the idea set, and (2) whether a person’s idea set is focused on a dominant content area (‘focused idea set’) or includes ideas impacting a range of content areas (‘diverse idea set’) (refer to Table 2-2).

(2) *Volume of ideas*: As per the quest of most of the technological search research and certain opportunity recognition and organizational creativity studies to quantify the number of innovations generated or opportunities identified by their units of analysis, the dimension of idea set volume examines the quantity of ideas within a person's idea set. More specifically, idea set volume refers to the quantity of new business ideas contained within a person's idea set over a given period of time, that is: all new business ideas entering, remaining within or leaving a person's consciousness over a specified period.

(3) *Stages of development of ideas*: This dimension is concerned with the temporal evolution of idea sets and characterizes idea sets according to the various stages of development of ideas contained therein. Ideas may be categorized along a number of stages and three possible evolutionary pathways (viz. continued pursuit, deferment or abandonment) suggested by scholars of the dominant stage paradigm in innovation and entrepreneurship process literature (e.g. Bhave, 1994; Burgelman, 1983, 1991; Churchill & Muzyka, 1994; McGrath, Venkataraman, MacMillan, & Boulind, 1992). Identifying developmental stages through which ideas may progress is consistent with the dominant stage paradigm in innovation and entrepreneurship process literature (e.g. Bhave, 1994; Burgelman, 1983, 1991) which reflects an initially individual, cognitive process that transforms over time into a social, action-oriented (behavioral) process.

The integration of idea volume and idea stage dimensions enables a number of temporal features of idea sets to be compared across people, and across different contexts. For example, characteristics such as 'idea set dynamism' and 'idea set actualization' (refer to Figure 2-1) may be examined. Idea set dynamism identifies the frequency of turnover amongst ideas in an individual's idea set; idea set actualisation describes the ratio of ideas that are acted upon (i.e. that a person, or another party in their parents company, seeks to exploit).

(4) *Value logics of ideas*: This dimension characterizes idea sets by the value logic of their constituent new business ideas. We draw on Moran and Ghoshal's (1999) distinction between 'value creation' and 'value appropriation' to differentiate between the overarching strategic logics that may inform new business ideas. This dichotomy identifies value creation as the formation of new sources of economic rent, while value appropriation refers to sustaining existing sources of competitive advantage (Moran & Ghoshal, 1999): value creation 'grows the

pie' while value appropriation 're-slices the pie'. Accordingly, individual ideas in a person's idea set may be concerned primarily with either creating new sources of value or with more effectively appropriating existing sources of value.

Like content – and indeed we would expect some, but not perfect, correspondence between idea content and the strategic logic of ideas – this is an underexamined aspect of variation in companies. Some theorists would argue that entrepreneurial ideas are those that are associated with value creation rather than value appropriation (cf. Dess, Lumpkin, & McGee, 1999). We suggest, however, that both value-creating and value-appropriating logics are appropriate objects for entrepreneurial ideas, especially in corporate settings. More encompassing definitions of CE include strategic renewal, and not only the creation of new businesses within companies (Guth & Ginsberg, 1990; Dess et al., 1999). Hence, a new product-market combination initiated by an existing firm is not the only form that CE is thought to take. Congruent with this conceptualization of CE, the Schumpeterian (1934, 1950) combinations perspective identifies a number of resource types along which innovation may occur. New combinations entailing new process technologies or methods of production, for example, will frequently to embody cost reduction rationales that are consistent with appropriating existing sources of industry or company value. In practice, value-appropriating initiatives are likely to be the most common forms of innovation or CE in existing companies, with potentially highly significant impacts on company performance.

As per the content dimension, an analysis of the strategic logics of ideas within an idea set can enable us to discriminate between (1) idea sets that differ according their dominant strategic logic, and (2) whether a person's idea set is focused on just one strategic logic or encompasses both value creating and value appropriating strategic logics.

(5) *Novelty of ideas*: As indicated in the previous chapter, attempts to calibrate the novelty of an idea or innovation occur with some frequency in creativity literature and in broader (especially technological) innovation literature, where a radical-incremental distinction appears in many forms (for example, Ahuja & Lampert, 2001; Gatignon et al., 2002; Rosenkopf & Nerkar, 2001; Tushman & Anderson, 1986; Utterback, 1987). This distinction typically relates to outcome novelty (i.e. the novelty of an innovation output, such as a product or technological innovation). Creativity literature suggests, however, that both processes and outcomes may

differ in their degrees of novelty. We hence incorporate two conceptions of idea set novelty within the idea set construct: one focused on ideation process novelty, and one focused on the novelty of the outcome (i.e. of the idea itself).

Turning to the process novelty construct, we sought a generic idea categorization that embodies, as far as is possible, traces of the cognitive and knowledge combination or transformation processes through which it was generated. The theoretical device that we introduce – knowledge configuration archetypes – decomposes ideas into their component configurations of knowledge. Figure 2-2 introduces the archetypes.

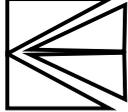
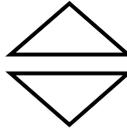
	Routine Configuration	Applicative Configuration	Combinative Configuration	Reframing Configuration
Known Elements	Situation and action known	Situation or action known	Some elements of situation or action known	Situation and action unknown
Graphic Depiction				
Market Metaphor	Market as allocation process	Market as discovery process	Market as discovery and creative process	Market as creative process

Figure 2-2 Knowledge Configuration Archetypes

Four qualitatively different configurations of knowledge are proposed to differentiate idea generation processes. These four configurations are defined by which elements of the idea are known or unknown to an individual at the outset of the process. Literature on the structures constituting opportunities and creative ideas frequently refers to two standard elements or components, variously termed ‘needs-solutions’ (Goldenberg, Lehmann, & Mazursky, 2001), ‘functions-forms’ (Finke, Ward, & Smith, 1992), ‘demand-supply’ (Sarasvathy et al., 2003), ‘value sought-value creation capability’ (Ardichvili et al., 2003), and so on. We draw on these

constructs, using the terms, respectively, ‘situation’ and ‘potential action’ here. For example, a ‘situation’ may refer to an identified market need while a ‘potential action’ may refer to a product or service that is perceived as suitable by an idea generator. These terms are used as they do not embody strong connotations of either problemistic or non-problemistic search (Cyert & March, 1963) but rather appear compatible with either problems or opportunities as starting points for search.

More specifically, the four opportunity configuration archetypes are differentiated by whether the situation and/or the potential action are known or unknown to an individual upfront. This typology extends and re-interprets Sarasvathy et al. (2003) and Ardichvili et al.’s (2003) identification of different market conditions that may inform opportunity recognition from a more subjectivist perspective, viewing what were considered by these authors to be different ‘objective’ conditions in terms of different knowledge processes. In what is termed here a ‘routine configuration’ both the situation and the potential action are known to an individual. In an applicative configuration, either the situation or the potential action, but not both, is known to an individual upfront. In a combinative configuration, some but not all elements of the situation and/or potential action are known to an individual upfront. Finally, in a reframing combination, neither the situation nor the potential action is known upfront by the individual. Each of the four configurations is elaborated on below and illustrated by examples from the research interviews:

Routine Configuration. This configuration is closest to the neo-classical problem-solving paradigm in which the situation and the potential action are known to an individual and are ‘matched’ through the use of deductive thinking. The individual is typically able to apply their local knowledge (from whichever functional, company and/or sectoral, and so on, domain in which they are located) to reconcile a situation with a potential action, without needing to engage in further search. The pilot research provided a number of illustrations of routinized idea generation, a simple example being the use of readily available automated packaging procedures to reduce bottlenecks in the manufacturing and distribution process in an operating company. To the Operations Manager who saw this action as an opportunity to reduce lead-time, the usage of automation was an ‘obvious solution’ to the packaging bottleneck.

Applicative Configuration. In the case of applicative idea generation, one element of the idea (that is, either the situation or the action) is initially known to an individual. Knowledge

is then applied – hence the term ‘applicative’ - either through deductive reasoning or through individual knowledge of existing practices or needs (typically from more distant locations within an individual’s domain) to complement the known element. The known configuration element is thus matched with a complementary situation or potential action arrived at through deductive reasoning or through the transfer of existing knowledge to the given circumstances. Applicative opportunity perception appears most akin to Kirzner’s (1973: 68) description of ‘opportunity discovery’ whereby the entrepreneurially alert individual who possesses superior knowledge of “knowing where to look for knowledge” is able to “harness available information already possessed (or capable of being discovered)” to exploit unnoticed opportunities.

An example of applicative idea generation concerns a Finance Director deciding to imitate a customer-oriented financial planning and reporting tool he had seen developed by a fellow member of a professional group of finance directors from non-competing companies. When his operating company decided to focus its efforts on obtaining a more strategic understanding of its customer base, he thought the time was right to produce a similar database tool.

Combinative Configuration. This configuration presents a greater challenge to an individual as it requires both more complex forms of the knowledge matching process described for applicative idea generation as well as greater use of imagination. In this form, only elements but not all components of either (or both) the situation or the potential action are known upfront by an individual. The individual is thus required to piece together disparate pieces of knowledge to perceive an opportunity, necessitating both cognitively more complex and more divergent (Guilford, 1950, 1967) thought processes. It overlaps both ‘creative’ and ‘discovery’ modes of cognition (Buchanan & Vanberg, 1991), being akin to what some creativity theorists have deemed more minor or constrained forms of creativity¹⁵, involving (Mumford & Gustafson, 1988:31): the “extension of existing structures to significant but more limited problems”.

¹⁵ It should be noted that debate is ongoing in creativity and problem-solving literature as to whether creative processes represent one end of a continuum of cognitive processes, and thus whether ‘degrees of creativity’ exist, or whether creative processes are distinctive enough from other forms of cognition such that a person or a thought process may be validly classified as either ‘creative’ or ‘not creative’ (see for example, Ward, Smith, & Finke, 1999; and Nickerson, 1999). It is not our intention to further this debate here and thus the opportunity configuration

An example of combinative idea generation was described by a Marketing Manager when conceptualizing a stylish dispensing system for home use in washing and bathing. She described the origins of her thinking as combining (1) consumer needs for reduced clutter in their bathrooms and (2) for increased convenience in purchasing washing and bathing products (both identified through market research) with (3) a company-identified trend towards more aesthetic decoration by homeowners in the United Kingdom and (4) seeing an unusual product packaging system being introduced by another product category within her company.

Reframing Configurations. This form of idea generation involves the most creative cognitive processes of the four archetypes. It entails an individual progressing from a state in which he or she knows neither the form of the situation nor of the potential action but rather ‘invents’ these (possibly through the use of analogies and metaphors) such that existing knowledge pertaining to the relevant domain(s) is substantially reframed. A paradigmatic shift representative of ‘breakthrough’ or ‘radical’ innovations (Christensen & Bower, 1996; O’Connor & Rice, 2001; Tushman & Anderson, 1986) may accompany ideation of this type.

An illustration of an idea generation experience that represents this configuration is the following: a Technology Manager was approached by an inventor who had developed a revolutionary cheap, disposable pump technology to dispense epidural analgesics to mothers during childbirth. The manager came up with the idea of substantially adapting the technology to administer standard doses of an over-the-counter medication to children in a non-spill fashion. This application was very distant from the domain in which the inventor had envisaged its use, and related to a product category in which the manager had previously worked within the company. He described his thought process in the following manner:

Then twenty years later, you see this [the auto-dosing technology for epidural analgesics], and I think, ‘This can pump gels’. If I make this press in and twist until it clicks, and I know that 5 grams has been dispensed and that it will be dispensed every time, I could even dispense it [the childrens’ medication] into a little cup ...and the child can slop the liquid around and it still won’t come over the side [as occurs with medicine spoons currently in use].

typology described in this section should be interpreted as archetypal rather than representing a strict continuum or delineation of cognitive processes.

2.4 Development of Idea Set Instrument

In order to develop an instrument that adequately measures corporate knowledge workers' idea sets, we engaged in a three-phase development and testing process. First, we undertook exploratory, interview-based research into the phenomenon of entrepreneurial idea generation in large, established firms. We developed and dimensionalized the idea set construct during this phase, seeking to maximise its construct validity through rigorous grounding via our interviews in the field. We then piloted two version of the questionnaire, focusing again on ensuring construct validity (as well as content validity of the specific items of the measures) and ease of response across a spectrum of knowledge worker roles and a range of corporate settings. Finally, we collected self-report survey data from 388 knowledge across three large, multinational companies; supplemented by supervisory assessments in one of the companies. Together, these data were used to establish adequate levels of convergent, discriminant and predictive validity for the idea set instrument.

2.4.1 Exploratory Research Study

We initially undertook a period of exploratory research, principally via in-depth interviews. This was an essential component of the research project given the under-explored nature of our phenomenon of interest, especially in the setting of large, established firms. This exploratory phase was particularly critical to familiarizing ourselves with the phenomenon of interest, and to developing a rigorous understanding of our primary constructs. A number of significant changes resulted en route regarding how we viewed the key constructs and viable data collection methods.

We first conducted semi-structured interviews with 20 knowledge workers who had attended a London Business School executive short course (the 20 interviewees representing 87% of the total of 23 short course attendees). All were from Sara Lee - a large, multinational FMCG company - and represented a number of its different functional areas and operating companies. They also varied considerably along dimensions such as tenure, nationality, seniority and personal experience. The individual interviews (all tape-recorded and transcribed) averaged 40-50 minutes per interviewee. These were held face-to-face for participants based in

the United Kingdom (3 participants) and in The Netherlands (5 participants). The remainder – based in Belgium, China, Greece, Malaysia, Singapore, Spain, the United States, and 2 additional participants from The Netherlands - were interviewed telephonically.

The interviews followed a semi-structured format, examining: (1) participants' career backgrounds in terms of tertiary studies and previous jobs held; (2) the role and activities of their current job; (3) progress (or otherwise) made on pursuing an individual entrepreneurial initiative identified during the executive course (a key mandate of the researchers in being given access to conduct these interviews); (4) other ideas being considered or pursued; and (5) ideas that had been discarded, rejected or 'put on hold' over recent months. Participants were remarkably forthcoming in the discussions, possibly as a result of goodwill and rapport generated from the short course, and supported by confidentiality assurances.

A further component of the exploratory research study involved interviewees completing a first version of the questionnaire. Twelve participants did so, translating into an overall response rate of 52% of total course attendees and 60% of those interviewed. This draft questionnaire was structured around respondents answering a series of questions on one (or more, if applicable) entrepreneurial idea they were considering at the time. It provided numerous spaces for comments and elaboration of 'other' responses throughout. A handful of respondents also provided verbal feedback on the process of completing the questionnaire to the principal researcher.

As we progressed through the interviews and analysed the survey responses¹⁶, we came increasingly to question the feasibility (and value) of focusing on 'the opportunity' or 'the idea' as the unit of analysis, increasingly seeing an idea set construct (or, rather, our very early formulations thereof) as a more viable and interesting unit of analysis for examining the range of ideas generated by corporate knowledge workers. Using a variety of cross-case tabulations (Miles & Huberman, 1994) to analyse the interview data, it became apparent to us that our

¹⁶ Hill (2003) discusses at some length the difficulties encountered in the first version of the questionnaire and efforts to remedy these in the second version (i.e. the piloted version). Principal amongst these were: the inability to assess the representivity of the ideas mentioned by individuals amongst those they were considering; extreme difficulties encountered by respondents in estimating the likely future economic value of their ideas; concerns around confidentiality in describing individual ideas; and reliance on individual willingness (and boredom tolerance) to detail more than one idea being considered.

sample could readily be differentiated in terms of their idea sets along dimensions such as the volume, content, strategic logic, fluidity, and novelty of ideas, as well as the extent to which they acted to pursue their ideas. These analyses also suggested patterns of association, as we had anticipated, between factors such breadth and depth of individual experience, breadth and depth of exposure to contextual stimuli, and idea set characteristics (Hill, 2004), thereby providing preliminary support for the predictive validity of an idea set construct.

We hence decided to focus on reformulating our questionnaire not around participants identifying and dimensionalizing specific ideas, but rather to examine their idea sets as our primary unit of analysis: a unit of analysis we view as having greater construct validity for understanding the antecedents and outcomes of entrepreneurial behavior in corporations than the single exploited ‘opportunity’ or ‘innovation’ typical of extant entrepreneurship and innovation approaches. The exploratory research phase with Sarah Lee participants also suggested a number of other changes to how we envisaged and measured our constructs, as well as additional aspects to include or to omit. We will touch on a few of these later in the chapter.

2.4.2 Development of Measures and Pilot Testing

We then undertook a second round of questionnaire development, this time piloting a revised version of the questionnaire based around the idea set construct, with a convenience sample of 30 knowledge workers known to the researchers. Participants came from multiple countries (primarily South Africa and the United Kingdom) and companies, and again reflected wide variation in terms of functional area, tenure, disciplinary background, seniority and personal experience. The measures and their items reflected a combination of existing scales, constructs based on extant literature and items suggested by the exploratory research study. We used this pilot research to test whether the new measures were understood, readily answerable and sufficiently comprehensive. We also tested the psychometric properties of these new measures in this round of pilot research. This testing resulted in refinements to the scales employed, and increased our confidence in the construct validity of the new measures.

It warrants brief mention here too that we chose to structure the questionnaire around the ideas generated by individuals over a six-month period. We could find little guidance in either the existing cognitive psychology or organization theory literature on typical patterns in respect

of the temporal duration of ideas. Indeed, a contentious debate in memory literature centres on whether any stored knowledge is ever ‘lost’ or, rather, remains accessible given appropriate retrieval conditions (cf. Medin et al., 2002; Morrison, 2005; Neumann, 1996). Furthermore, memory and attention research is typically concerned with cognitive processes that span a number of seconds or minutes. Lesser focus is given to interim temporal periods in this literature, i.e. to processes over days, weeks, and months. Hence, we examined the typical length over which participants in the exploratory research reported considering the ideas they discussed with us, and used this as the basis for employing a six-month period for our dependent variables. Future research may wish to investigate alternative periods in order to establish measures that minimise recall bias but remain practicable.

2.4.3 Empirical Testing of Instrument

Self-report data collection: The principal data collection phase involved a postal survey of 388 knowledge workers. This self-reported survey data was deemed essential given the primarily cognitive (Baron & Ensley, 2006; Corbett, 2007; Gaglio & Katz, 2001; Shane, 2003) and hence intra-personal nature of the phenomenon under investigation. The data we draw on here to describe the properties of the idea set instrument – as well as to demonstrate its predictive utility in the following chapter - is derived from this postal survey. Full sampling of participating divisions within three companies across different levels, functions and countries was used to obtain responses from a range of knowledge workers. The companies were all large publicly-held, multinationals from diverse sectors: one a major milk ingredients arm of a milk company; another, a major household products FMCG company; and the third, a major pharmaceutical company.

The multiphase contact process closely followed that of Dillman’s (2000) ‘tailored design method’, with three paper communication phases per participant. In addition, an advance company endorsement e-mail was sent out by a senior manager within each company to notify those sampled to expect the questionnaire to arrive over the following few days (via the internal company mail systems). Self-addressed, pre-paid envelopes were provided for the confidential return of completed questionnaires directly to the researchers. An overall response rate of 55 percent was obtained.

Respondents and non-respondents were compared by geographic location and functional area. Chi-squared and protected t-tests, conducted to test for systematic differences between respondents and non-respondents, found significant differences for the geographic locations and functional areas of respondents and non-respondents. Specifically, the proportion of British and European respondents was somewhat higher than expected, whilst fewer than expected responses were received from other countries (including from the United States, Australia, South Africa, and a number of countries in South America, the Middle East and Asia) (χ^2 , df (5) = 52.96, p = .000). Regarding the functional areas¹⁷ of respondents, the proportionately higher-responding groups were in operations as opposed to logistics or technical functions (χ^2 , df (1) = 19.04, p = .000), and in new business development or R&D groups, as opposed to marketing functions (χ^2 , df (5) = 3.04, p = .04).

Supervisory data collection: Although some facets of idea sets are clearly of an exclusively intra-personal nature and would not be readily observable by others (such as the volume of ideas discarded or not acted on, as well as the thought processes and sources underlying the development of ideas), we collected a set of supervisory assessments on responding employees from one of the participating companies in an attempt to establish the convergent validity of the idea set measures. Overall, these ratings show some correspondence with those of the responding participants, lending support for their validity. The supervisory questionnaire attained an excellent response rate: 89 percent (34) of supervisors in the company responded, covering 88 percent (75) of individual respondents from the company to the principal questionnaire.

2.5 Properties of Idea Set Instrument

The measures used in the principal survey to examine the idea set dimensions are provided in Appendix 2-A. We report first the properties of the two single-item measures, namely: idea set content and idea set knowledge configurations. Thereafter, we report on the

¹⁷ Regrettably, complete data comparing the functional areas of respondents and non-respondents were only available for two of the three companies participating in the survey collection phase.

properties of the multi-item measures, namely: idea set volume and idea set value logic (both measures with formative indicators (cf. Diamantopoulos & Winklhofer, 2001; MacKenzie et al., 2005), and idea set novelty (a reflective measure). In all, the measures show good evidence of confirmatory and discriminant validity, as well as high reliability (where appropriate). The means, standard deviations and correlations between the measures are shown in Table 2-2.

Idea Set Content. Schumpeter's (1934) list of new or changed goods, new methods of production, new markets, new sources of supply, and new organization of production served as the foundation for our measure of idea set content. We amended 'new or changed goods' to also include services; 'new organization of production' was amended to 'new or changed internal processes' based on pilot participant feedback. We also turned to contemporary literature on business concepts (or 'business models') (e.g. Kim & Mauborgne, 2004; Markides, 2000) to identify additional elements that may constitute 'new combinations', and drew on the distinctions in terminology made by the participants in our exploratory interviews. We hence added items regarding new distribution channels, new marketing or sales approaches, new technologies underlying a product or service, and new business models. In our final measure for idea set content, we asked respondents to reflect on whether their ideas over the previous six months had entailed either new or changed aspects along each content domain. Each of the final nine items constitutes a single idea content domain. Given this, it is inappropriate to examine reliabilities or internal factor structure for this measure; Table 2-3 indicates however (through the relatively low correlations between the idea set content items and the other idea set measures) that it captures a distinctive component of the idea set construct.

Idea Set Knowledge Configurations. A single-item measure with multiple response categories was used to assess the spread of knowledge processes through which individuals had generated ideas over the previous 6-month period. Consistent with our earlier proposition that four non-overlapping knowledge configurations underlie individual idea generation processes, the response categories of the single-item measure were constructed so as to capture the percentages of ideas within an individual's idea set reflecting each of these mutually exclusive configurations. Specifically, each of the knowledge configurations was tapped via the following response categories (refer to Appendix 2-A for the measure):

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Idea Set Content																			
1. Content 1 (product or service)	1.97	.83	-																
2. Content 2 (technology)	1.74	.74	.21																
3. Content 3 (market)	1.54	.67	.38	.00															
4. Content 4 (production process)	1.60	.753	.08	.35	.09														
5. Content 5 (distribution or logistics)	1.29	.53	.10	-.04	.33	.01													
6. Content 6 (marketing or sales)	1.57	.76	.38	-.06	.60	-.22	.34												
7. Content 7 (source of supply)	1.32	.52	.08	.23	.07	.32	.14	.03											
8. Content 8 (business model)	1.391	.55	.20	.03	.22	-.10	.26	.40	.09										
9. Content 9 (internal process)	1.82	.72	-.18	.07	-.10	.18	.11	.04	.19	.14									
Idea Set Knowledge Configurations																			
10. Configuration 1 (routine)	18.97	18.76	-.14	-.01	-.03	-.06	-.05	-.04	-.07	-.03	-.00								
11. Configuration 2 (applicative – situation)	32.18	20.48	.05	.00	-.11	-.01	-.09	-.12	.00	-.05	.04	-.10							
12. Configuration 3 (applicative – action)	20.36	18.82	.08	.05	.02	.01	.02	.05	.03	-.03	-.15	-.29	-.40						
13. Configuration 4 (combinative)	19.48	17.88	.04	.02	.05	.03	.06	.05	.08	.07	.04	-.41	-.29	-.17					
14. Configuration 5 (reframing)	8.30	14.68	-.03	-.05	.10	.05	.07	.07	-.05	.04	.10	-.25	-.34	-.09	-.04				
Multi-item Measures																			
15. Idea Volume	2.15	.67	.40	.28	.30	.09	.23	.36	.13	.36	.08	-.18	-.10	.07	.14	.14			
16. Value Creation	3.56	1.55	.53	.21	.52	-.03	.23	.50	.10	.36	-.08	-.19	-.12	.09	.17	.10	.51		
17. Value Appropriation	3.74	1.51	-.12	.19	-.09	.38	.17	-.04	.24	.10	.49	-.02	.00	-.11	.09	.10	.11	.02	
18. Idea Novelty	3.86	1.20	.30	.30	.28	.10	.24	.34	.13	.30	.14	-.15	-.15	.07	.12	.20	.57	.49	.25

Table 2-2 Means, Standard Deviations, and Correlations

n = 388 (knowledge workers)

All correlations greater than or equal to .14 are significant at the 0.01 level (2-tailed); correlations greater than or equal to .10 are significant at the 0.05 level (2-tailed).

- (1) routine configuration – “the problem and the solution fitted each other pretty clearly right from the start”;
- (2) applicative configuration – “the problem was fairly clear to me from the start. I then needed to find a suitable solution” (problem-driven applicative configuration) and “I first saw an idea or practice. I then thought about where I could put it into practice in my work environment” (opportunity-driven applicative configuration);
- (3) combinative configuration – “I could see only some elements of the problem and/or the solution at the start. I then had to piece together what I already knew with new information to create the idea”;
- (4) reframing configuration – “There was no clear problem or solution that I respond to – rather, I reframed the way we do business (or part of the business) to generate a rule-changing new idea”.

The managerial assessments collected in the final phase of the research study indicated that respondents and their supervisors agreed more on the extent to which routine ideas were generated (Pearson’s $r = .25$, $p = .02$), than the more novel forms of ideation^{18,19}. This moderate level of convergence between self- and other-ratings was consistent with our expectations: we did not expect very strong convergence on this idea set dimension given the intra-personal nature of the processes examined. As per the idea set content measure, it is inappropriate to examine reliabilities or internal factor structures for this measure given its single-item nature; Table 2.3 indicates however (through the relatively low correlations between the idea set knowledge configuration items and the volume, content and value logic measures) that it captures a distinctive component of the idea set construct.

¹⁸ The significant correlation reported here was between self-reported percentages of ideas fitting the routine idea generation configuration and managerial ratings along the item “He/she tends to come up with ideas that are highly routine e.g. where a problem has a pretty clear solution”. Managerial responses to the items “He/she comes up with ideas that substantially reframe the way we do business (or an aspect of our business) i.e. develops many ‘rule-changing’ or ‘frame-breaking’ ideas” and “Many of his/her ideas could be described as visionary and frame-breaking” were not significantly correlated with any of the self-reported knowledge configuration processes. One-tailed tests were used.

¹⁹ Similarly, there was a higher – but negative, as would be anticipated - correspondence (Pearson’s $r = -.31$, $p = .01$) between the self-reported novelty outcome measure and routine ideation, than between the novelty outcome measure and the more novel ideation process types.

Idea Set Volume. To assess idea set volume, we sought to identify a comprehensive (but not overwhelming to survey respondents) inventory of the developmental stages through which an idea may progress. For each developmental stage, respondents were asked to estimate the number of ideas they had considered or worked on over the previous six month period. We derived the inventory of stages both from our review of the literature as well as descriptions of idea status that emerged during the exploratory interviews²⁰. This inventory was then tested during the two initial rounds of questionnaire development, and the ranges given by the response options were derived from our frequency analysis of the pilot data. The pilot research also evidenced large differences in the size (i.e. the volume of ideas) of individuals' idea sets, suggesting that this dimension was tractable for empirical investigation (Hill, 2003, 2004).

The measure for idea volume is clearly a formative one (MacKenzie et al., 2005): overall volume is indicated by the totality of ideas reported across all developmental stages. Furthermore, we would not expect a high correspondence between the sets of antecedents that determine, for example, the volume of individual versus team ideas, or the volume of ideas individuals generate and those accepted by firms. We found, contrary to our expectations, via exploratory factor analysis that a single component accounts for a great deal of variance across the individual items. Specifically, principal component analysis indicated that a single factor (with an eigenvalue of 3.48) accounted for 50 percent of the variance in the responses across the items, with item loadings ranging from .59 to .81. As a single-factor scale too, it showed good levels of reliability (Cronbach's alpha = .83). CFA also indicated that all items loaded significantly on a single factor ($p < .001$), providing increased evidence for the convergent validity of the measure.

Additionally (as demonstrated in Table 2-3 showing the correlations between the items and aggregate measures of the multi-item idea set measures), the idea set volume measure shows good evidence of discriminant validity. This is indicated by the pattern of lower loadings of idea set volume items on the other multi-item measures than on itself. This is an important finding as,

²⁰ Two adjustments we made to our initial thinking as a result of the exploratory interview data were: (1) to include an 'on hold' (i.e. temporarily deferred for future attention) category for ideas still being considered by individuals or their companies before action may/may not be pursued (viz. a category we did not find in our review of the literature, but that was mentioned on a number of occasions by pilot interviewees); and (2) to differentiate between early stage ideas being explored alone or as part of a team.

while procedures and standards for establishing the validity - and, especially, the convergent validity²¹ - of formative measures are still under development (cf. Diamantopoulos & Winklhofer, 2001; MacKenzie et al., 2005), there appears to be a broad consensus that examining the location of formative measures in a nomological network of constructs is a critical component of such an endeavour. Accordingly, Table 2-3 provides evidence for the discriminant validity and, to a lesser extent, the convergent validity of the multi-item idea set measures.

	Idea Set Novelty	Idea Set Volume	Idea Set Value Creation	Idea Set Value Appropriation
Idea Set Novelty				
Item 1	0.87	0.51	0.44	0.27
Item 2	0.84	0.46	0.33	0.19
Item 3	0.81	0.42	0.39	0.20
Item 4	0.81	0.50	0.48	0.14
Overall Measure	1.00	0.57	0.49	0.25
Idea Set Volume				
Item 1	0.43	0.62	0.33	0.08
Item 2	0.40	0.75	0.39	0.10
Item 3	0.48	0.79	0.46	0.08
Item 4	0.39	0.75	0.37	0.12
Item 5	0.29	0.65	0.32	0.15
Item 6	0.35	0.69	0.30	0.00
Item 7	0.44	0.66	0.34	0.01
Overall Measure	0.57	1.00	0.51	0.11
Idea Set Value Creation				
Item 1	0.37	0.43	0.87	-0.20
Item 2	0.42	0.48	0.88	-0.17
Item 3	0.32	0.25	0.50	0.48
Overall Measure	0.49	0.51	1.00	0.02
Idea Set Value Appropriation				
Item 1	0.15	0.14	0.06	0.78
Item 2	0.26	0.09	0.04	0.84
Item 3	0.19	0.04	-0.05	0.78
Overall Measure	0.25	0.11	0.02	1.00

Table 2-3 Correlations between Multi-Item Idea Set Measures

n = 388 (knowledge workers); Pearson correlation coefficients shown.

Highlighted sections indicate correlations of items on their intended measures; inter-measure correlations are shown in bold.

²¹ Given that, by definition, one does not necessarily expect high correlations between all items comprising formative measures (MacKenzie et al., 2005), too much emphasis should not be placed here on the individual item correlations. Standards of adequate loading of items on formative measures are yet to be agreed given this definitional issue.

Interestingly, but not unexpectedly, the supervisory assessments we collected for responding employees in the final data collection phase indicated that individual and supervisory perceptions of the volume of ideas generated only correlated significantly for those ideas that were currently being launched or implemented (Pearson's $r = .21, p = .04$) and for the broader set of ideas that had attained company support (Pearson's $r = .20, p = .04$)²². Ideas in early stages of development, those for which company support was still being sought, and those that had been rejected or deferred by either the individual or the company were not significantly correlated with supervisory assessments.

Idea Set Value Logic. We looked to the strategic management literature on competitive advantage in developing items to capture the strategic logic underlying an idea. An examination of classic sources (e.g. Ansoff, 1957; Lieberman & Montgomery, 1988; Porter, 1980, 1985) suggested a number of strategies for attaining competitive advantage, including: differentiation, cost leadership, early mover advantage, utilization of existing physical assets (a Ricardian rent concept), and market expansion strategies. We also observed the strategic rationales commonly provided by our pilot interviewees behind their ideas. We found strong functional differences in dominant strategic logics in our Sara Lee exploratory research sample, indicating that this was an important dimension along which to differentiate idea sets.²³

We then classified rationales derived from both interviewee and literary sources as either predominantly value creating or value appropriating in logic. The items addressing these sources of competitive advantage were and tested for comprehensiveness and ease of understanding during the pilot research phase, resulting in a number of amendments. A six-item measure resulted with three formative indicators for value creation, and three formative indicators for value appropriation. As per the idea set volume measure, the correlations in Table 2-3 provide

²² The measure for the set of ideas that had attained company support included two items: the number of ideas (1) "that have evolved into projects sponsored by the company", and (2) "that are currently being launched or implemented by the company". One-tailed tests were used.

²³ We found that people in support and operations functions tended to perceive opportunities to optimise existing internal processes, whilst those in marketing, logistics, new business development and sales functions exhibited a greater orientation towards market-oriented offerings that sought strategic goals of company growth and differentiation. Two interesting avenues for analysis may be: (1) factors that encourage the generation of ideas from outside the dominant functional orientation towards a specific strategic logic; and (2) how much commonality there is across antecedents of value creating versus value appropriating ideas.

evidence for the discriminant validity as well as the convergent validity of the two value logic measures.

Idea Set Novelty. Our outcome-based novelty measure consisted of four reflective items examining the extent to which respondents viewed their ideas as novel, indicated by terms such as ‘frame-breaking’, ‘unconventional’ and ‘visionary’. Principal component analysis indicated that all four items fell on a single component with an eigenvalue of 2.76 explaining 69 percent of variance (Cronbach’s alpha = .85). Item loadings ranged from .81 to .87. CFA also indicated an excellent fit of the data to a single-factor model (TLI = .999, CFI = 1.00, RMSEA = .015). All items loaded significantly (at $p < .001$) on the single factor. As per the process novelty measure, supervisory assessments indicated that respondents and their supervisors agreed more on the extent to which routine ideas were generated (Pearson’s $r = .25, p = .02$), than on the presence of more novel forms of ideation. In all, this measure demonstrates strong levels of convergent and discriminant validity, as well as possessing very high levels of reliability.

2.6 Discussion and Conclusions

Our intention in this chapter was to advance a new conceptualisation of new business ideas – the idea set - in corporate contexts and to describe initial attempts to measure this conceptualisation empirically.

Our proposal for the idea set construct arose out of several concerns regarding applying extant literature on entrepreneurial opportunity recognition to the corporate context, as well as the limited examination of early-stage variation in the literature streams reviewed in Chapter 1. In particular, entrepreneurship opportunity recognition research frequently focuses on businesses founded by independent entrepreneurs as a historical proxy for opportunity recognition, or on a set of ideas triggered in response to a discrete experimental stimulus; the technological search stream focuses on counts of already commercialized innovations from (the R&D units within) established firms; and the organizational creativity literature focuses on a general assessment of the creativity of a person’s ideas, or, like the opportunity recognition stream, the set of ideas triggered in response to a discrete experimental stimulus.

Critically, a new conceptualisation of opportunities in corporate settings appeared necessary to facilitate advances in theoretical thinking on corporate idea generation, as well to make researching these more empirically tractable. The idea set construct and measures embody *three major points of departure* from extant approaches.

First, the idea set captures a far *more comprehensive* set of cognitive artefacts concerned with “possible conjecture[s] that a set of resources is not put to its ‘best use’” (Shane & Venkataraman, 2000: 220) than do extant approaches in the entrepreneurship field. The neo-classical economic focus on “who sees which opportunities” (Shane, 2003; Shane & Venkataraman, 2000) has tended in reality to translate into using ‘the (single) opportunity’ as the starting point for analysis, rather than the flipside: i.e. which (and, possibly, multiple) opportunity(ies) does a person identify? This tendency is apparent in the dominant usage of business founding as a proxy for opportunity recognition (Gaglio, 2004). It biases the analysis of opportunity recognition to those ideas which a person decides to exploit and (in most research designs) which survive for a sufficient period to be subject to research.

These biases would not be problematic if: (a) no ‘false negatives’ or ‘false positives’ occurred in entrepreneurs’ decision making (i.e. if all entrepreneurial ideas that were generated by an individual but not pursued at a given time were not in fact lucrative and viable opportunities, and vice versa); and (b) if the factors and processes impacting venture survival were identical to those constituting opportunity recognition. Unfortunately the bounded rationality (March & Simon, 1958) of human cognition and circumstances of Knightian risk (Knight, 1964) seriously mitigate against the former assumption holding true, while an emerging body of literature suggesting that the antecedents of opportunity recognition and opportunity exploitation differ significantly from each other (Corbett, 2007; Davidsson & Honig, 2003; Dimov & Shepherd, 2005; McMullen & Shepherd, 2006) casts doubt on the validity of the latter assumption.

Hence, in the absence of robust methods of forecasting the value of entrepreneurial opportunities *ex ante*²⁴, we assert that examining the full range of entrepreneurial ideas under

²⁴ This is a point many economists who do not take the presence of pure uncertainty seriously (e.g. the Knightian, 1964, concept of risk) would likely dispute. See for example the work of Åstebro & Gerchak (2001) in this respect.

consideration (and tracking their evolution over time) presents a considerably less biased representation of entrepreneurial cognitions for that agent. In this respect, the idea set construct regards entrepreneurial ideas at any stage of development and relating to any aspect of a business offering as valid subject matter, plus takes an active interest in those ideas which are forgotten, rejected or 'put on hold' over time. It hence enables the analysis of opportunity recognition to penetrate beyond the traditional product-market focus of innovation and business founding studies, as well as the ideas tapped via quasi-experimental studies into opportunity recognition. The methods advocated here also have a relative advantage over the latter studies in being oriented towards actual ideas being considered by an individual, rather than ideas triggered in response to a specific stimulus, although such studies indeed have considerable value in helping to isolate specific antecedents of opportunity recognition.

A second point of departure of the idea set construct and measures is its *greater dimensionality*. Ideas have been differentiated along the following characteristics in this chapter: volume, content, stage of development, value basis, outcome novelty, and composite knowledge configurations (i.e. process novelty). These dimensions allow for the systematic comparison of one person's idea set with that of another person. While it is common to characterise product and technological innovations along multiple dimensions (such as a radical-incremental distinction) (Gatignon et al., 2002), this appears rare in the literatures we have reviewed on early-stage variation (for conceptual exceptions see Ardichvili et al., 2003, and Sarasvathy et al., 2003). Furthermore, in developing our typology of idea sets' composite knowledge configurations, we have introduced a knowledge-based categorization of process novelty into the entrepreneurial opportunity literature. The typology decomposes ideas into their component configurations of knowledge, articulating the cognitive and knowledge combination (or transformation processes; more on this in the following chapter) through which they were generated. In so doing, we extend and re-interpret Sarasvathy et al. (2003) and Ardichvili et al. (2003)'s (three-way) categorization of markets from a more subjectivist perspective, thereby facilitates more direct investigation into alternative knowledge-based cognitive processes underlying entrepreneurial idea generation.

It should be noted that the dimensions we have identified and measured here are not intended to be comprehensive and that further work may wish to examine additional idea set

characteristics. Rather, the dimensions described here are ones that were indicated in our research as being tractable to assess and measure *ex ante* across a range of content areas - even when ideas were highly embryonic. A dimension quantifying the economic size of an idea (and hence the value of an individual's complete idea set at any given time) is an obvious exclusion from the set of dimensions outlined here (Åstebro & Gerchak, 2001). This we contend, based both on our field work and in taking *ex ante* uncertainty (Knight, 1964) seriously, is an important dimension, but one better assessed for already commercialised ideas or those that have been subject to further social selection regimes.

A third point of departure is the grounding of the construct and measures within the *corporate context* rather than in an independent venture setting. While it appears that, fundamentally, the idea set construct would be equally relevant to understanding opportunity recognition of independent entrepreneurs, the specific dimensions and measures we have proposed here may be better suited to the corporate context. In particular, we would expect certain of the content dimensions – especially those not pertaining to the product-market mix – as well as the value appropriation orientation to be much more applicable to the opportunities perceived by employees dispersed across a corporation than to an entrepreneur considering starting an independent business.

We turn now to discussing further implications of the work described in this chapter to theory and research methods.

2.6.1 Implications for Theory

The idea set unit of analysis appears to provide a critical 'bridge' (or missing link) between contextual and individual antecedents, and entrepreneurial behavior, holding the potential to shed light on what is currently largely a 'black box' in entrepreneurship literature.

A person's idea set mediates between their context and their actions to pursue (or otherwise) new ventures – it, metaphorically, acts as the cognitive bridge between their personal and situational context, and the observable entrepreneurial behaviors in which they engage. By viewing opportunity from an idea-based perspective and building a far more comprehensive 'picture' of the ventures or initiatives a given person may be thinking about at any time, the idea set construct facilitates more finely grained theory development on two important issues within

the field of entrepreneurship. Specifically, it aids theory development on: (1) identifying who generates entrepreneurial ideas with which characteristics; and (2) which factors affect the fate of entrepreneurial ideas (e.g. whether they are pursued, abandoned, forgotten or deferred).

In this manner, the idea set construct may help advance theory regarding “why do some people and not others discover particular entrepreneurial opportunities?” and “why, when, and how do some people and not others exploit the opportunities that they discover?” (Shane & Venkataraman, 2000: 221, 222), or even extend its capacity beyond these already challenging central questions for entrepreneurship scholars.

2.6.2 Implications for Research Methods

Empirical methods to measure entrepreneurial opportunities are probably still in their infancy, accompanying the recent surge of interest in this topic (Corbett, 2007; Dimov, 2004; Ireland & Webb, 2007). These methods have a very tricky phenomenon to try to capture – definitional inconsistencies and ambiguities notwithstanding (McMullen & Shepherd, 2006), cognitive phenomenon are invariably difficult to measure, especially those of a strongly intra-personal nature. Hence, any method is likely to be controversial and to provide only partial clues to the underlying nature of its subject.

Future work may indeed suggest refinements or amendments to our idea set dimensions and measures, but we hope that that they represent a useful advancement at this point in understanding theoretically and operationalizing empirically this challenging phenomenon. The idea set measures indeed showed fair evidence of both divergent and convergent validity, and our field work suggests they get much closer to the nature of corporate entrepreneurial ideas than does the received theory on opportunities or the dominant methods used to measure entrepreneurial opportunities in independent settings. In addition, the empirical analyses described in following chapter indicates their practical utility in enabling discrimination between different sets of antecedents of idea set dimensions.

We would certainly encourage further development and testing, particularly via multi-source assessments and the use of multiple research techniques, a point we return to in discussing the limitations of the study in the final chapter of the dissertation.

2.6.3 Conclusion

To conclude, it is evident that the organization and management field still has a considerable way to go in understanding new business idea generation in large, established firms. The time may, however, be ripe for furthering knowledge in this domain given advances in technological search, entrepreneurial opportunity recognition and organizational creativity literatures, along with burgeoning interest in innovation and entrepreneurship amongst both small and large firms.

In this chapter, we have described our efforts to develop a new conceptualisation of new business ideas – viz. ‘idea sets’ - and to subject this to empirical measurement. We developed and tested our measures in a multi-stage field study, comprising extensive pilot research; a survey of 388 knowledge workers across 3 large, multinational organizations; and longitudinal case studies of 22 knowledge workers observed over a 12-month period. We hope that others will also take up the challenge of advancing knowledge of this important and intriguing domain.

APPENDIX 2-A

Idea Set Measures

The measures below are from the principal survey. The following examples of ideas were provided to guide responses: ideas for growing the business, for improving its competitive position, for making systems or processes work more efficiently, for improving customer service, etc.

Content of Ideas:

Respondents were asked to examine the content of the business ideas they had thought about or worked on over the previous six months and to indicate the extent to which their ideas had been about the specified nine business domains. Response options were, from left to right: ‘none of my ideas’; ‘some of my ideas’; ‘most of my ideas’; and ‘all of my ideas’.

- New product or service, or new features of a product or service
- New or changed technology underlying a product or service
- New or changed customers or markets being targeted
- New or changed manufacturing/production processes
- New or changed distribution channels or logistics chains
- New or changed marketing or sales approach
- New or changed source of supply
- New or changed business model
- New or changed internal process

Knowledge Configuration of Ideas:

Respondents were asked to indicate the approximate percentages of the ideas they had thought about or worked on over the previous six months that had originated through five specific thought processes. The following additional instruction was included: “Read all category descriptions (A to E) before noting the percentage of ideas appropriate to each category. It is acceptable to note “0%” for a category if the category does not describe a thought process you experienced generating your new business ideas. Please ensure that the percentages sum to 100%.” An ‘other’ option, with space for a written comment, was also provided, but no responses were provided by respondents to this option.

A	+	B	+	C	+	D	+	E	=	TOTAL
The problem and the solution fitted each other pretty clearly right from the start.		The problem was fairly clear to me from the start. I then needed to find a suitable solution.		I first saw an idea or practice. I then thought about where I could put it into practice in my work environment.		I could see only some elements of the problem and/or the solution at the start. I then had to piece together what I already knew with new information to create the idea.		There was no clear problem or solution that I respond to – rather, I reframed the way we do business (or part of the business) to generate a rule-changing new idea.		
_____ %	+	_____ %	+	_____ %	+	_____ %	+	_____ %	=	100%

Volume and Stage of Ideas:

Respondents were asked to estimate the number of business ideas they had thought about or worked on over the previous six months. The following additional instruction was included: “Please read all the category descriptions before marking the number of ideas that fit into each. If an idea has passed through a number of stages, count it only for the category that describes it at its most. It is acceptable to check “zero” for any (or all) categories if you have not been thinking about new ideas over the past six months.” Response options were, from left to right: ‘0’; ‘1-2’; ‘3-4’; ‘5-10’; and ‘11+’.

- Ideas I am thinking about and/or evaluating on my own (i.e. ideas that I have not yet told people in the company about)
- Ideas I am thinking about and/or evaluating as part of a team
- Ideas I am trying to get the company interested in supporting
- Ideas that have evolved into projects sponsored by the company
- Ideas that are currently being launched or implemented by the company
- Ideas I was excited about but which I have decided to discard or to put on hold
- Ideas I was excited about but which have been rejected or put on hold by the company

Value Logic of Ideas:

Respondents were asked to indicate the extent to which strategic benefits could be gained from the business ideas they had thought about or worked on over the previous six months if they went ahead. The following additional instruction was included: “Focus on direct benefits that could reasonably be expected from implementing your ideas.” The first three items related to value creation; the latter three to value appropriation. Response options were from ‘1’ (not affected by my ideas) to ‘7’ (significantly enhanced by my ideas). An ‘other’ option, with space for a written comment, was also provided.

- Expansion of the company’s markets and/or customer base
- Increased differentiation of our products from competitors’ products
- More rapid response to changes in the business environment
- Reduced cost of existing products or services
- Better utilisation of existing company assets
- Improved internal systems and processes

Novelty of Ideas:

Respondents were asked to indicate the role new ideas played in their day-to-day work-life. Response options were from ‘1’ (strongly disagree) to ‘7’ (strongly agree).

- My colleagues would describe many of my ideas as visionary and frame-breaking.
- I come up with thoughts about different ways to do things that other people in the company think are slightly “off the wall” or unconventional.
- I frequently find solutions to business problems or to business situations from outside the typical boundaries of my job.
- The ideas I generate for our business often meet needs or issues that have not yet been widely recognized in the industry.

CHAPTER III

ANTECEDENTS OF IDEA GENERATION IN LARGE, ESTABLISHED FIRMS: A COMPARISON BETWEEN NOVELTY AND VOLUME OF NEW IDEAS

3.1 Introduction

This chapter builds on its predecessor by demonstrating the practical utility of the idea set construct and instrument to better understanding the antecedents of corporate idea generation in dispersed contexts. Our focus is on the origins of idea generation by knowledge workers *across* a firm - that is, idea generation confined not only to knowledge workers separated within a discrete 'exploratory' unit such as a R&D laboratory, a corporate venture unit or a technology scouting unit. To date, this has been the subject of extremely limited research.

We address the following, primary question from our first research domain, viz. opportunity recognition via dispersed modes of corporate entrepreneurship (refer to Section 1.2 'Research Domain and Questions'):

How do individual knowledge and contextual stimuli influence the nature of entrepreneurial opportunities recognized by corporate knowledge workers?

This is a central but under-explored question for the domain of corporate opportunity recognition. Our definition of, and approach to, addressing this question are informed by the essentially cognitive, intra-personal nature of opportunity recognition and the key role knowledge plays therein (Baron & Ensley, 2006; Corbett, 2007; Dimov, 2004, 2007a; Shane, 2000, 2003). Accordingly, we draw on entrepreneurial opportunity recognition, technological search (in the Carnegie school tradition) and organizational creativity literatures (cf. Section 1.4.1 'Dispersed Opportunity Recognition in Large, Established Companies' for a review of these literatures) in developing our propositions. These propositions are concerned with the impact of individual knowledge and cognitive features of an individual's corporate context on

their idea set characteristics. The overarching theoretical lens we employ to integrate these contributing literatures is one of information processing (Simon, 1947, 1979, 1997).

Specifically, we theorize that different knowledge-based antecedents and processes discriminate between idea set novelty (the novelty of a person's ideas at a given time) and idea set volume (the quantity of ideas a person is considering at a given time) amongst dispersed corporate knowledge workers. Despite being probably the most widely used dimensions on which innovations or ideas are differentiated, idea novelty and volume are seldom investigated together (Shalley, 1995; Shepherd & De Tienne, 2005; and Ucbasaran, Westhead, & Wright, 2008, presenting rare exceptions). Hence, existing literature is little able to draw systematic inferences regarding commonalities or differences in the origins of *how many* versus *how novel* the ideas generated by corporate knowledge workers are.

The combination of individual knowledge, contextual stimuli, and cognitive process antecedents we theorize and examine empirically has also not, to the best of our knowledge, been integrated elsewhere in this research domain. Indeed, individual and contextual factors are very seldom addressed simultaneously in opportunity recognition or idea generation literatures (Oldham & Cummings, 1996, presenting a rare exception). To the contrary, many of the empirical methods currently employed within the domain effectively mitigate against the joint investigation of the individual knowledge (depth and breadth), individual exposure to contextual stimuli (depth and breadth) and the information processing constructs we undertake here. Employing the multi-stage field methodology described in the previous chapter, we are able to test an extended and novel set of propositions regarding the antecedents to corporate knowledge workers' idea sets in a comprehensive, integrated manner not yet present in existing literature.

Four sections comprise the chapter. In the first section, we outline our propositions regarding commonalities and differences between the antecedents of idea set novelty and idea set volume. In the second section, we describe the analyses we used to test our propositions. We then, in the third section, discuss the findings of these analyses. We conclude with a discussion regarding the potential of the study to advance knowledge of the generation of new business ideas in large, established firms.

3.2 Theory and Hypotheses

Figure 3-1 portrays the theoretical framework which underlies the arguments we develop in this section. The framework represents the mutual influences of knowledge structures and context on individual idea generation in corporate contexts. It asserts, drawing on the three contributing literature streams described earlier, that people will be able and motivated to generate a body of ideas, in accordance with the knowledge embodied in their current schemata, the situational contexts that channel their attention towards specific stimuli, and the interaction between these sets of factors.

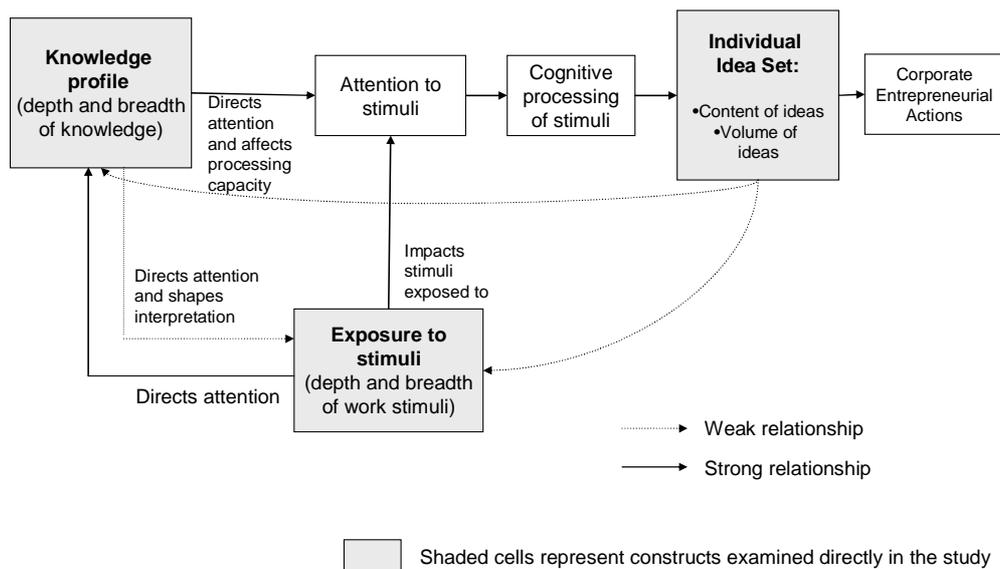


Figure 3-1 Framework of Corporate Idea Generation

Over the longer-term, the cognitive context in which an individual is 'situated' will influence not only the stimuli they are exposed to and thus the ideas they generate at any given time, but will also shape their knowledge profile. Vice versa, an individual's knowledge profile will shape their situational context over time too. Consequently, over time, cognitive features of context and individual knowledge are likely to exert strong mutual reinforcement.

We turn now to outlining our hypotheses regarding differences in the cognitive antecedents and knowledge processing mechanisms that account for the *novelty* versus the *volume* of corporate knowledge workers' idea sets. Factors relating to the breadth and depth of an individual's knowledge, the breadth and depth of their exposure to stimuli, and to the equivocality of their informational context, will be hypothesized in turn.

3.2.1 Individual Knowledge Base

Multiple literatures indicate that an individual's knowledge base will impact the ideas they generate. Indeed, a key premise of Austrian economic perspectives on entrepreneurship is that information on (material) entrepreneurial opportunities is unevenly distributed across societies: those with superior access to information will be able to identify such opportunities (Jacobsen, 1992; Kirzner, 1973, 1979, 1997; Shane, 2000). This premise has had a significant impact on entrepreneurial opportunity recognition literature, with a number of recent studies having proposed, and confirmed empirically, that opportunity recognition in independent settings appears to require at least some domain-specific knowledge in order to comprehend new possibilities (e.g. Corbett, 2007; Davidsson & Honig, 2003; Dimov, 2003; Shepherd & De Tienne, 2005; Shane, 2000). The standard concomitant theoretical grounding of such studies is that of 'human capital' (Becker, 1964, 1993), which examines the 'returns to investment' of specific and general forms of human capital.

Bounded rationality (March & Simon, 1958) provides an alternative but potentially complementary rationale for an individual's knowledge base influencing their idea generation characteristics. It suggests that existing individual schemata, subject to human cognitive capacity constraints, will result in the selective attention to and processing of stimuli (Fiske & Taylor, 1991; March & Simon, 1958). Along similar lines, Ronstadt's (1988) work on the 'knowledge corridor' principle in entrepreneurship suggests that an individual's idiosyncratic prior knowledge creates a 'knowledge corridor' that allows them to recognize only certain opportunities. In addition, creativity literature has "universally acknowledged that one must have knowledge of a field if one hopes to produce something novel within it" (Weisberg, 1999).

An individual's knowledge base hence is likely to be critical to the nature and volume of ideas they generate. Existing knowledge provides a key platform for interaction with new

experiences (Corbett, 2007), influencing how (and whether) incoming stimuli are attended to and processed. The firm-level concept of absorptive capacity represents a useful analogue to the role we see being played by individual prior knowledge in idea generation: absorptive capacity typically refers to “a firm’s ability to value, assimilate, and apply information toward commercial ends” (Zahra & George, 2002: 198). More generally an absorptive capacity argument holds that existing knowledge provides a necessary foundation for the assimilation and processing of new information (Cohen & Levinthal, 1990; Zahra & George, 2002). Individual knowledge – which we characterize in terms of breadth and depth – provides simultaneously the *capacity* and the *lens* through which an individual encounters incoming stimuli and converts (or otherwise) these into new business ideas.

Broad Knowledge: By knowledge breadth, we mean the scope of a corporate knowledge worker’s knowledge - both tacit and explicit (Polanyi, 1966) - across multiple domains. We take the individual’s ‘local’ context (Stuart & Podolny, 1996) as the starting point for examining their breadth of knowledge. Specifically, we view knowledge breadth in terms of the range of domains they have experience in outside of their particular functional unit in their current company. An individual’s breadth of knowledge addresses the extent to which they have, for example, experience in multiple companies, and across multiple industries, business disciplines, intra-firm units, and geographic borders: that is, across the boundaries shown to be influential for knowledge creation in the knowledge management (e.g. Haas, 2006; Hansen, 1999; Schultz, 2001, 2003) and technological search literatures.

A broad base of prior knowledge enables the recognition and assimilation of a broad range of stimuli. Consistent with absorptive capacity arguments (Cohen & Levinthal, 1990), existing knowledge facilitates the ‘absorption’ of related incoming knowledge. At the firm level, a study by Bierly and Chakrabarti (1996) confirmed that firms with broad knowledge bases were more able to integrate knowledge from different search streams. In parallel terms, at the individual level, existing schemata constrain the degree to which incoming stimuli are attended to and interpreted (Fiske & Taylor, 1991; Ocasio, 1997). Those persons with broader knowledge bases will be more able to make ‘connections’ between their schemata and a wide range of stimuli. In turn, this capacity to process of a broader range of ‘problem-solution’ (Goldenberg, Lehmann, & Mazursky, 2001) or ‘situation-potential action’ combinations (or individual

elements thereof; refer to Section 2.3.2 ‘Idea Set Dimensions’) facilitates the generation of a higher volume of new ideas.

To date, research on general human capital (as probably the closest analogue to our broad knowledge construct in the independent venturing context) and opportunity recognition has been extremely limited. A study by Davidsson and Honig (2003) found Swedish nascent entrepreneurs to have higher levels of general human capital²⁵ than their counterparts not engaging in entrepreneurial activities; while Corbett (2007) found general human capital to be positively but not significantly associated with the number of ideas generated by high-technology industry professionals.

Thus existing theoretical arguments and (albeit limited) empirical research suggest that a broad knowledge base will encourage the generation of entrepreneurial ideas by an individual. We contend that the impact of knowledge breadth will be particularly marked for a corporate knowledge worker’s volume of ideas. So, while greater knowledge breadth is expected to positively impact idea set novelty, it is likely to have an especially strong influence on idea set volume. The broader a person’s knowledge base, the more they are able to ‘make connections’ (Baron, 1998; Shepherd & De Tienne, 2005) between problem and solution elements, thus seeing more potentialities for new sources of economic gain. The novelty of such connections is, however, critically dependent on the nature of individuals’ exposure to incoming stimuli (a point we return to shortly). Accordingly we expect that:

Hypothesis 1a: *The broader the knowledge base of a knowledge worker in a large, established firm, the more novel their idea set.*

Hypothesis 1b: *The broader the knowledge base of a knowledge worker in a large, established firm, the larger their idea set.*

Hypothesis 1c: *Broad knowledge is more significantly associated with the volume of ideas generated by a knowledge worker in a large, established firm, than with the novelty of their ideas.*

²⁵ There are some commonalities between the measures employed by Davidsson and Honig (2003) and Corbett (2007) to examine general human capital. Davidsson and Honig (2003) measured general human capital via a number of indicators, namely: years of education, attendance of (or otherwise) classes on starting a business, previous start-up attempts, total years full-time paid work experience, and number of years supervisory or managerial experience. Corbett (2007) used an index of each individual’s age, job level, years in current job, years in current firm, and years in current industry.

Deep Knowledge: By knowledge depth, we refer to the intensity of a corporate knowledge worker's knowledge - both tacit and explicit – of their local context. Specifically, we view knowledge depth in terms of an individual's volume of knowledge within their particular nexus of functional, geographic, company and industry (and so on) loci. Conceptually, breadth and depth are orthogonal dimensions of knowledge although in practice limited attentional (and other) resources are likely to result in trade-offs between the two, at least beyond certain limits.

As with knowledge breadth, the depth of a person's knowledge base will influence the manner (as well as the likelihood) with which incoming stimuli are attended to and interpreted (Fiske & Taylor, 1991; Ocasio, 1997). A deeper knowledge structure that involves “more, stronger, and richer links between concepts” (Shepherd & De Tienne, 2005: 94) is likely to enhance a person's ability to identify both more, and more novel, potentialities. As creativity theorists have long asserted (Amabile, 1988; Amabile et al., 1996; Weisberg, 1999), although not investigated in any detail in organizational settings, it “would be difficult to be creative in an area without having some experience about what has historically been constituted as routine or the status quo” (Shalley & Gilson, 2004: 36).

In this vein, a recent stream of opportunity recognition research has started to examine the impact of specific human capital on the identification of opportunities. This stream is currently a little larger than that addressing general human capital and opportunity recognition, although it is likewise restricted to the independent venturing context. Using founder interviews and case studies, respectively, studies by Ardichvili and Cardozo (2000) and Shane (2000) have shown that the nature of opportunities identified by individuals reflects their knowledge of a specific market domain. In addition, quasi-experimental research by Corbett (2007), Dimov (2003, 2007a), and Shepherd and De Tienne (2005), has indicated specific human capital – viz. knowledge of a specific technology and/or market – to be positively associated with the number of opportunities identified by a person. The latter study also found specific human capital to be positively associated with the innovativeness of opportunities identified.

Limits may exist, however, to the beneficial impact of knowledge depth on the volume and novelty of ideas generated by an individual. Beyond a critical level, additional increases to knowledge depth may actually reduce the volume and novelty of ideas generated. Two key

mechanisms exert themselves at very high levels of expertise. One is the biases and information-processing shortcuts associated with expert cognition (Baron, 1998; Ericsson & Lehman, 1996; Ucbasaran et al., 2008). These ‘competency traps’ (Levitt & March, 1988) include: inferring too much from limited information; becoming overly constrained by the familiar; and becoming overconfident. Indeed, high familiarity with a domain may reduce the salience of incoming stimuli (Fiske & Taylor, 1991) and encourage ‘habitual’ performance of tasks (Ford, 1996). Corporate knowledge workers with considerable expertise in a particular domain are hence likely to reach a point where they plateau or generate a reduced number of (less innovative) ideas.

A second (and complementary) mechanism for declining idea generation beyond an optimal level of knowledge depth, relates to the limits of local search within one’s own experiential base. In the words of Katila and Ahuja (2002: 1185) “there is a limit to the number of new ideas that can be created by using the same set of knowledge elements”. As the limits of an existing knowledge trajectory are reached, their benefits to idea generation decline as new knowledge elements become increasingly expensive and solutions become excessively complicated (Katila, 2002; Katila & Ahuja, 2002).

Empirically, Katila and Ahuja (2002) and Ucbasaran et al. (2008) tested for and found support for inverted U-shaped relationships: Katila’s (2002; Katila & Ahuja, 2002) firm-level study in the robotics industry found how frequently a firm reused its own knowledge to have an inverted U-shaped relationship with their volume of product innovation; Ucbasaran et al. (2008) demonstrated prior business ownership experience amongst entrepreneurs to have an inverted U-shaped relationship with the number but not the novelty of opportunities they identified.

We contend, as per the hypotheses concerning knowledge breadth, that the impact of knowledge depth will be particularly marked for a corporate knowledge worker’s volume of ideas. So, while depth of knowledge is expected to impact idea set novelty, it is likely to have an especially strong influence on idea set volume. Deep knowledge critically impacts the extent to which incoming events and information are attended to, processed and connected with existing schema. The novelty of such connections, and thus the novelty of their idea set, is, however, critically dependent on the nature of a person’s exposure to incoming stimuli. Accordingly we expect that:

Hypothesis 2a: *There is an inverted U-shaped relationship between the depth of knowledge of a knowledge worker in a large, established firm and the novelty of their idea set.*

Hypothesis 2b: *There is an inverted U-shaped relationship between the depth of knowledge of a knowledge worker in a large, established firm and the volume of their idea set.*

Hypothesis 2c: *Deep knowledge is more significantly associated with the volume of ideas generated by a knowledge worker in a large, established firm, than with the novelty of their ideas.*

3.2.2 Individual Exposure to Contextual Stimuli

Despite established traditions of theorizing environmental influences in many organizational literatures, including that of corporate entrepreneurship (e.g. Zahra, 1991; Zahra & Covin, 1995), context has received little attention in the opportunity recognition literature (cf. Arenius & De Clercq, 2005; Dimov, 2004, 2007b; Ozgen & Baron, 2007). In addition, context has typically been viewed from a motivational rather than informational perspective in organizational creativity literature. We hence rely most directly on the technological search literature, as well as compatible information processing and attention literatures (e.g. March & Simon, 1958; Ocasio, 1997; Thomas & McDaniel, 1990), in contending that cognitive, informational features of a person's work context will strongly impact the body of ideas in their idea set.

We employ the constructs of breadth of exposure and depth of exposure to stimuli, the origins of which lie in the Carnegie search constructs²⁶, to characterise the stimuli in an individual's work context. Depth and breadth of exposure describe the range and nature of stimuli an individual comes into contact with in the work context in which they are situated. Such exposure carries the 'raw material' individuals may interpret as opportunities for economic gain within a particular context (Dutton, 1993; Thomas & McDaniel, 1990). Specifically, a person's profile of exposure will act to direct attention towards certain stimuli and away from

²⁶ The closest analogues appear to be those employed by Katila and Ahuja (2002) and Laursen and Salter (2006). Katila and Ahuja (2002) distinguished between 'search scope' (i.e. distant technological search) and 'search depth' (i.e. the extent which a firm draws on its own technological knowledge), although the latter construct combines both elements of experience and exposure. Laursen and Salter (2006: 134) differentiate between external search breadth and external search depth, where the former refers to "the number of external sources or search channels that firms rely upon in their innovative activities" and the latter to "the extent to which firms draw deeply from the different external sources or search channels". Technological search literature is more typically concerned with examining exposure to broad stimuli (possibly as this may be somewhat easier to operationalize) than to 'deep' stimuli, however, and hence the distinction we draw here between depth and breadth of search is not widely employed within this body of literature at present.

others (Ocasio, 1997), and to influence the interpretation of stimuli (Dutton, 1993). In turn, these impact individuals' enactment of their environment (Weick, 1979), including their generation of new ideas.

Broad Exposure to Stimuli: Breadth of exposure to stimuli identifies the range of stimuli to which a corporate knowledge worker is exposed. As the stimulus-based counterpart to broad individual knowledge, we conceptualize breadth of exposure as the range of domains a corporate knowledge worker has contact with, outside of their particular functional unit in their current company. We hence once more take the individual's local context (Stuart & Podolny, 1996) as the starting point for examining their breadth of exposure. A person with broad exposure will encounter, on an ongoing basis, events and issues (of both a social and non-social nature) across multiple domains, including across multiple countries, companies, industries, business disciplines, and units within their present company.

The central finding of technological search research is that broader search scope – i.e. more 'distant' search – is associated with more instances of firm-level innovation (e.g. Katila, 2002; Katila & Ahuja, 2002; Martin & Mitchell, 1998; Laursen & Salter, 2006; Nerkar, 2003; Rosenkopf & Almeida, 2003; Rosenkopf & Nerkar, 2001; Phene, Fladmoe-Lindquist, & Marsh, 2006; Stuart & Podolny, 1996). Similarly, individual creativity research has indicated that a broad range of interests is associated with creativity (Oldham & Cummings, 1996); while broader communication channels have also been demonstrated to enhance small-group creativity in organizations (Ancona & Caldwell, 1992; Kanter, 1988).

Broader exposure to stimuli provides a larger base of informational raw material for processing by knowledge workers in corporate settings. This larger base, through extending search from local to more distant domains (Cyert & March, 1963; Stuart & Podolny, 1996), brings individuals into contact with greater diversity of problem and solution combinations (Goldenberg et al., 2001) that can either be applied fairly directly or via transformation as new ideas. Encountering a wide range of information is thus likely to positively impact both the novelty and volume of ideas generated by knowledge workers.

Constraints to human information processing capacity (March & Simon, 1958), nonetheless act to limit the extent to which exposure to diverse stimuli creates corresponding

increases in idea set volume and novelty. Cognitive overload can occur in both attentional and processing components of idea generation. Attention is not an unlimited resource. Indeed, in the words of Simon (1997: 40): “a wealth of information creates a poverty of attention”. Extensive exposure to broad sources of information may create difficulties in the allocation of attention (Koput, 1997) by corporate knowledge workers, leaving attention diffusely scattered across a subsection of potentially valuable incoming stimuli. Connections between stimuli, or between stimuli and existing knowledge, which may otherwise yield ideas may be entirely overlooked or be attended too for insufficient periods. Even if new stimuli are able to receive early attention, they may not (due to competing cognitive demands) be subject to sufficiently intensive processing to yield ideas regarding business opportunities. Accordingly, a number of studies at the firm level (e.g. Laursen & Salter, 2006; Phene et al., 2006; Wadhwa & Kotha, 2006²⁷) (although not all of the studies²⁸ testing for this possibility), have found inverted U-shaped relationships between breadth of search measures and the volume of firm-level innovation. In the Laursen and Salter (2006) study, an inverted U-shaped relationship was also demonstrated between broad search and the novelty of innovations. Consequently, we contend that breadth of exposure is curvilinearly (in an inverted-U form) associated with idea set novelty and volume.

Very highly novel innovations have frequently been attributed to the bringing together of diverse – and especially, rarely united - fields of enquiry (e.g. Fleming, 2001; Guilford, 1950, 1967; Hargadon & Sutton, 1997; Koestler, 1964; Martin & Mitchell, 1998). Hence, while we anticipate that both idea set volume and idea set novelty will be influenced by breadth of exposure, we expect that its impact will be particularly marked for a corporate knowledge worker’s novelty of ideas.

Accordingly:

²⁷ The study by Wadhwa and Kotha (2006) differs in a number of respects from others we classify here as representing the technological search stream. A particular deviation worth comment is that it uses a count of corporate venture capital investments as its indicator of distant search, rather than the more typical deployment of patent citations as proxies for diverse search. Its dependent variable measure (viz. number of firm-level patent citations) is, however, more typical of this stream of literature.

²⁸ This is typically (cf. Katila & Auhja, 2002; Nerkar, 2003) attributed to either (from a methodological perspective) range restriction within the relevant datasource or (from a theoretical perspective) to efforts on the part of human agents to self-restrict the volume of information they process, thereby mitigating against cognitive overload.

Hypothesis 3a: *There is an inverted U-shaped relationship between the breadth of exposure of a knowledge worker in a large, established firm to stimuli and the novelty of their idea set.*

Hypothesis 3b: *There is an inverted U-shaped relationship between the breadth of exposure of a knowledge worker in a large, established firm to stimuli and the volume of their idea set.*

Hypothesis 3c: *Broad exposure to stimuli is more significantly associated with the novelty of ideas generated by a knowledge worker in a large, established firm, than with the volume of their ideas.*

Deep Exposure to Stimuli: By depth of exposure to stimuli, we refer to the intensity of a corporate knowledge worker's exposure to their local context. Specifically, we view depth of exposure in terms of an individual's deep interaction with events and informational sources (both social and non-social) within their particular nexus of functional, geographic, company and industry (and so on) loci. Conceptually, as per knowledge breadth and depth, breadth and depth of exposure are orthogonal dimensions of context although in practice limited attentional (and other) resources are likely to result in trade-offs in between the two within a given knowledge work role, at least beyond certain limits.

Per breadth of exposure, deeper exposure to stimuli provides a larger base of informational 'raw material' for processing by knowledge workers, bringing them into contact with a larger volume of problem and solution combinations (Goldenberg et al., 2001), or elements thereof. Hence, knowledge depth is also likely to positively impact both idea set novelty and volume. Similarly, the beneficial effects of deep exposure occur within limits. In addition to the attentional and processing deficits associated with cognitive overload (Koput, 1997; March & Simon, 1958; Ocasio, 1997), deeper exposure within a given domain is likely to be associated with encountering the limits of an existing knowledge trajectory, as well as increasing rigidity of individual schemata (Katila, 2002; Katila & Ahuja, 2002). Consequently, we expect to find inverted U-shaped relationships between depth of exposure and both idea set volume and novelty. In this regard, a recent study by Laursen and Salter (2006) - a very rare attempt to empirically examine search depth - indeed demonstrated a curvilinear relationship of

this form between how deeply firms use various external search mechanisms and their ‘innovative performance’²⁹.

We do not know of any empirical research or management theory that has addressed the relative impact of contextual depth (i.e. deep search) on innovation volume versus novelty. Any propositions in this regard must hence be regarded as tentative. In this spirit, the emphasis placed within the organizational creativity literature on the importance of ‘domain-relevant’ assessments of creativity (e.g. Amabile, 1988; Amabile et al., 1996; Conti, Coon, & Amabile, 1996) accords a critical role to how an innovator (or particular innovation) contributes to a particular domain. Thus, deep exposure may be a necessary condition for generating highly novel ideas (i.e. for ideas to make a meaningfully novel contribution to a domain) but not for generating a high volume of ideas. Accordingly, we suggest that deep exposure may play a more substantial role in impacting idea set novelty than idea set volume. We hence posit the following:

Hypothesis 4a: *There is an inverted U-shaped relationship between the depth of exposure of a knowledge worker in a large, established firm to stimuli and the novelty of their idea set.*

Hypothesis 4b: *There is an inverted U-shaped relationship between the depth of exposure of a knowledge worker in a large, established firm to stimuli and the volume of their idea set.*

Hypothesis 4c: *Deep exposure to stimuli is more significantly associated with the novelty of ideas generated by a knowledge worker in a large, established firm, than with the volume of their ideas.*

3.2.3 Idea Generation Processes

Finally, we propose that different knowledge processing mechanisms underlie the generation of *many* ideas versus *highly novel* ideas in corporate settings. We contend that, on the one hand, a *knowledge combination process* accounts primarily for idea set volume. This is akin to the combinatorial search (or ‘recombinant search’) (Fleming, 2001; Nelson & Winter, 1982; Schumpeter, 1934) processes proposed by technological search theorists, whose methodologies

²⁹ Laursen and Salter’s (2006) ‘innovative performance’ measure examined the percentage of firm sales attributable to ‘new to the world’, ‘new to the firm’ and ‘significant improvement’ innovation categories.

indeed facilitate measuring innovation volume rather than novelty. On the other hand, we argue that *knowledge transformation processes* account better for idea set novelty.

These propositions are informed by a fairly widely-accepted tenet of creativity theory (e.g. Guilford, 1950, 1967; Kaufmann, 2004; Kirton, 1976, 1994; Koestler, 1964; Mumford & Gustafson, 1988), namely: that two different levels (or types) of creative thinking occur. Improvements within existing frameworks and boundaries characterize lower (or ‘less radical’; depending on the theorist) levels of creativity. A more *fluid, transformative* type of information processing, where the outcome is substantially more novel than its constituent parts, characterizes more radical (or ‘higher’) forms of creativity.

Combinatory knowledge processes more accurately describe the former, ‘lesser’, type of creativity and hence account better for the generation of many – but not necessarily highly novel – ideas in corporate settings. In this respect, technological search literature has to date focused on ‘probabilistic’ accounts for the association between distant search and innovation volume. Such accounts link increasing search with corresponding increases in: (a) the volume of ready-made new variations (solutions) encountered; and (b) the volume of knowledge components susceptible to new combinations (Katila & Ahuja, 2002). A recombinant search process describes the latter process (Fleming, 2001; Nelson & Winter, 1982). Furthermore, recombinant search facilitates two forms of ‘combining existing solutions to generating new combinations’ (Schumpeter, 1934): creating new combinations from existing components, and reconfiguring the elements within an existing combination (Fleming, 2001; Fleming & Sorenson, 2001, 2004; Henderson & Clark, 1990). By drawing on a broad range of stimuli, a knowledge worker is better able to combine multiple sources of knowledge to generate a larger number of ideas regarding new business opportunities.

The principal knowledge processes accounting for the degree of novelty of individuals’ idea sets are likely to go beyond knowledge combination to incorporate the transformation of knowledge. Individual creativity literature has given some attention to the nature of the thought processes that may accompany more creative acts. For example, Mumford and Gustafson (1988) assert that “the *integration and reorganization* of cognitive structures might underlie major contributions, whereas the *extension of existing structures* to significant but more limited problems might underlie minor contributions” (emphases added). Similarly, Koestler (1964: 35-

36) proposed a distinction between associative and bisociative thought: associative thought involves acting within the confines of a matrix of experience (“thinking on a single plane”) whereas bisociative thought involves connecting previously unconnected matrices of experience (“operating on more than one plane”).

Equivocality might help trigger transformative thought processes. From an interpretative perspective, Drazin et al. (1999) noted how disruptive events may result in interpretative disorganization. Disruptive events introduce equivocality to situations: the meaning of events becomes ambiguous and subject to diverse interpretation (Daft & Macintosh, 1981; Weick, 1979). Interpretative disorganization accompanying equivocal situations creates fertile conditions for new sets of frames (or schema) to emerge (Drazin et al., 1999). Of relevance to broad search, research by Daft and Macintosh (1981) suggested that job variety may be associated with equivocality. Festinger’s (1957) influential theory regarding cognitive dissonance appears to represent a psychological parallel to interpretative disorganization and the emergence of new frames under conditions of equivocality. This theory proposes a tendency towards dissonance reduction: when a new cognition that is dissonant with a currently held cognition is encountered, it creates an internal state of ‘dissonance’ which can then be reduced either by eliminating dissonant cognitions, by adding new consonant cognitions, or by creating a transcendent new schema.

Drawing together these various ideas (see Figure 3-2 for a graphic representation), we propose that through exposure to broad stimuli, knowledge workers in established firms may encounter stimuli of a highly equivocal nature which encourage more transformative processing, resulting in ideas of greater novelty. Idea set volume does not, however, require equivocality, merely the combination or reconfiguration of existing components, or the direct application of existing combinations to a new context.

Accordingly we expect that:

Hypothesis 5a: Knowledge transformation thought processes partially mediate between broad exposure to stimuli and the novelty of knowledge workers’ idea sets in large, established firms.

Hypothesis 5b: Knowledge combination thought processes partially mediate between broad exposure to stimuli and the size of knowledge workers’ idea sets in large, established firms.

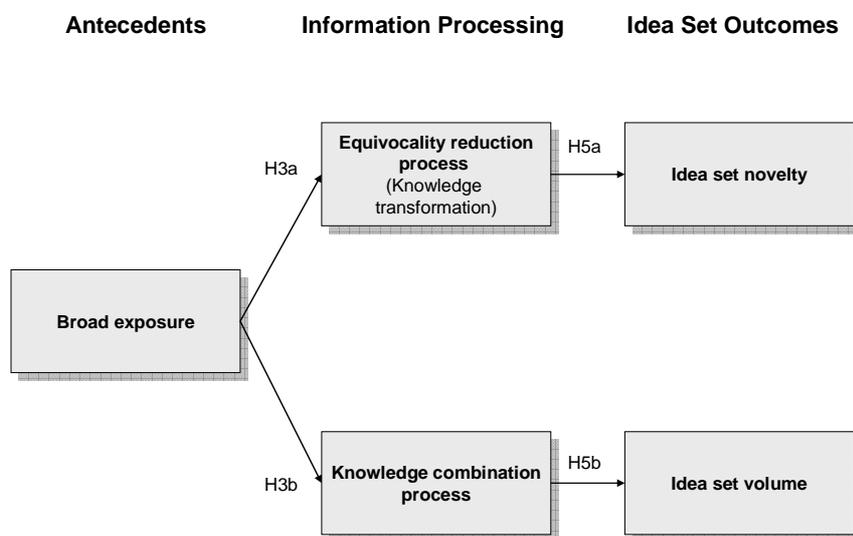


Figure 3-2 Knowledge Combination, Knowledge Transformation and Idea Set Characteristics

3.3 Methods

3.3.1 Research Design

Please refer to Chapter 2 for a description of the design of the research (specifically to Section 2.4 titled ‘Development of Idea Set Instrument’).

3.3.2 Measures

Dependent variables. The dependent variables are *idea set novelty* and *idea set volume*. The measures used to examine these are provided in Appendix 2-A, and the psychometric properties of these measures are discussed at length in Chapter 2 (refer to Section 2.5 titled ‘Properties of Idea Set Instrument’).

Independent variables. The items for the measures of the four independent variables – that is, breadth and depth of knowledge, breadth and depth of exposure to stimuli, and equivocality – are outlined in Appendix 3-A.

Of these, breadth and depth of experience constitute formative measures; breadth of exposure to stimuli constitutes a formative measure with reflective sub-dimensions; and depth of exposure to stimuli and equivocality constitute reflective measures. While procedures and standards for establishing the validity - and, especially, the convergent validity - of formative measures are still under development (cf. Diamantopoulos & Winklhofer, 2001; MacKenzie, Podsakoff, & Jarvis, 2005), there appears to be broad consensus that examining the location of formative measures in a nomological network of constructs is a critical component of such an endeavour. Accordingly, Table 3-1 provides indicators of the nomological relationships between breadth and depth of knowledge, the sub-dimensions of the breadth of exposure measure (as well as the aggregate measure), and two other measures employed in the analyses (viz. company support for innovation, and Gough's, 1979, creative personality measure).

	Deep Knowledge	Broad Knowledge	Broad Exposure to Stimuli	Company Support for Innovation	Creative Personality Scale
Deep Knowledge					
Item 1	.84	-.28	-.04	-.04	-.07
Item 2	.77	-.13	-.04	.08	-.14
Item 3	.82	-.29	-.07	.08	-.14
Item 4	.87	-.16	-.15	.01	-.21
Item 5	.87	-.31	-.03	.09	-.18
Overall Measure	1.00	-.28	-.08	.04	-.14
Broad Knowledge					
Item 1	-.23	.71	.08	-.02	.16
Item 2	.03	.41	.04	-.04	.01
Item 3	-.16	.63	.13	.02	.10
Item 4	-.29	.52	.31	.17	.20
Item 5	-.05	.38	.10	.15	.04
Overall Measure	-.28	1.00	.21	.10	.17
Broad Exposure					
Dimension 1	-.11	.22	.80	.38	.25
Dimension 2	-.20	.14	.78	.31	.33
Dimension 3	-.11	.11	.57	.15	.20
Dimension 4	-.01	.13	.81	.23	.25
Dimension 5	-.06	.16	.73	.26	.28
Dimension 6	-.07	.16	.72	.21	.34
Overall Measure	-.08	.21	1.00	.36	.37

Table 3-1 Discriminant Validity of the Formative Measures for the Independent Variables

n = 388 (knowledge workers); Pearson correlation coefficients shown.

Highlighted sections indicate correlations of items on their intended measures; inter-measure correlations are shown in bold.

Of critical importance to note here, as evidence of the discriminant validity of the three formative measures, are the fairly low correlations between the aggregate deep knowledge, broad

knowledge, and broad exposure measures and the other measures shown. Additionally, the pattern of lower correlations of the individual dimensions of these three formative measures on all other measures (versus on their own aggregate measure) provides further evidence of the formative measures' discriminant validities and, to a lesser extent, their convergent validities³⁰.

Broad knowledge measures an individual's diversity of experience across multiple work-related domains. Five items examining the number of functional areas, companies, industries, countries and (of their current company) divisions an individual had worked in acted as formative indicators of their breadth of work-related knowledge. These items were informed by our review of the technological search literature and categories of experience we encountered during the pilot phase of the research study. The measure comprises the mean value across the five items.

Deep knowledge examines the depth of an individual's experience within each of the five domains identified above for the breadth of knowledge measure. The measure is the mean value of the following ratios: (1) number of functional areas worked in over total years working, (2) number of companies worked in over total years working, (3) number of industry sectors worked in over total years working, (4) number of countries worked in (for a minimum of one month in succession) over total years working, and (5) number of divisions within the current company worked in over total years employed by that company.

Broad exposure to stimuli examines the range of stimuli to which knowledge workers are exposed through their role/s within their organization. The categories of stimuli to which knowledge workers may be exposed were arrived at from our review of the technological search and entrepreneurship opportunity recognition literatures, plus the domains mentioned by interviewees in the pilot research. The categories ultimately comprised: geographic stimuli (stimuli in other countries), industry stimuli (exposure to people and issues in other industries), internal company stimuli (exposure to issues and people in other units of the company), external stimuli (contact with customers, suppliers, industry associations, etc.), functional breadth (the

³⁰ Given that, by definition, one does not necessarily expect high correlations between all items comprising formative measures (MacKenzie et al., 2005), too much emphasis should not be placed here on the individual item correlations. Standards of adequate loading of items on formative measures are yet to be agreed given this definitional issue.

extent to which a job crosses disciplinary boundaries), and breadth of personal interests. Each dimension was measured by a set of reflective indicators (each possessing adequate psychometric properties)³¹, which were then aggregated into an overall measure of a formative nature (Podsakoff et al., 2005) representing an individual's breadth of stimuli.

Deep exposure to stimuli examines the depth of functional stimuli to which knowledge workers are exposed through their role/s within their organization. Principal component analysis indicated that two reflective items loaded on a single component with an eigenvalue of 1.49 explaining 74 percent of variance (Cronbach's alpha = .64). CFA too indicated an excellent fit of the data to a single-factor model (TLI = 1.028, CFI = 1.00, RMSEA = .00).

Equivocality examines the perceived ambiguity in the information encountered by the individual in their work context. The four reflective items were derived from a review of works on equivocality, including articles by Weick (1979), Daft and Macintosh (1981)³², Daft and Lengel (1986), and Dennis and Kinney (1998). Principal component analysis indicated that items loaded on a single component with an eigenvalue of 2.04 explaining 51 percent of variance (Cronbach's alpha = .68). CFA too indicated an excellent fit of the data to a single-factor model (TLI = 1.023, CFI = 1.00, RMSEA = .00). We use equivocality as a proxy for the occurrence of transformative knowledge processing by an individual.

Control variables. We controlled for possible alternative explanations via a set of 23 control variables. In terms of organizational level factors, we controlled for the effects of organization context using Gibson and Birkinshaw's (2004) *performance management* and *social context* scales. Once two items had been dropped from the performance management scale due to inadequate loadings, confirmatory factor analyses supported the anticipated 2-factor model (TLI = .867, CFI = .904, RMSEA = .083). We also used *company* dummy variables in case unmeasured company-specific factors influenced for the findings, as well as controlling for the degree of *company support for innovation*. This three-item company support for innovation

³¹ Principal component analysis demonstrated that the items for each dimension loaded on a single factor in each instance, accounting for between 66 and 85 percent of the variance. Cronbach alpha values were all acceptable, ranging from .74 to .87, with the exception of the Personal Interests dimension which had low reliability levels at .57. It was, nonetheless, included in these analyses given the uniqueness of its content.

³² Daft and Macintosh introduced a scale for equivocality in their 1981 article which we tested in our pilot research phase. We did not adopt the entire scale here as our pilot questionnaire data indicated other equivocality items to possess better psychometric properties.

measure examined the extent to which respondents perceived their company as valuing new business ideas, and providing formal systems and processes to support innovation (see Appendix 3-A for the items). Principal component analysis indicated that the items loaded on a single component with an eigenvalue of 2.09 explaining 70 percent of the variance (Cronbach's alpha = .78).

In terms of individual level control measures, single-item measures for *years in job*, *years in company* and *years working* (since school/university)³³ controlled for the impact of length of job experience, company tenure and length of work experience. Two dummy variables proxied past entrepreneurial experience - *started new company* and *started corporate venture* – both of which required respondents to indicate whether or not they had ever initiated a new business or venture. Another dummy variable controlled for respondent *gender*, while respondent *functional area* was also controlled for, along a list of categories confirmed with each participating company, using five dummy variables. These dummy variables categorized respondents as belonging to one of the following functional areas: (1) marketing and sales, (2) manufacturing/production, (3) logistics and distribution, (4) R&D/technical functions, or (5) general management. A set of *country* dummy variables controlled for the geographic location of the respondent. Respondents were categorized as residing in one of the following geographic regions: (1) the United Kingdom, (2) The Netherlands (with these first two categories comprising the largest number of respondents), (3) the rest of Europe, (4) the United States, (5) Asia or the Middle East, and (6) additional ('other') countries with smaller numbers of respondents.

Respondent *education* was measured by a single item asking for highest educational level attained (response options were, in reverse order: secondary school; diploma or undergraduate level degree; masters level degree; and doctorate). The impact of seniority was controlled for through a single item question (*number of reportees*) asking respondents for the number of staff reporting to them, both directly and indirectly. Finally, Gough's (1979) *Creative Personality Scale* was included to control for the impact of enduring creative personality traits on the analyses.

³³ These three control variables were used in the analyses testing for a mediating role of equivocality between broad exposure, idea novelty and idea volume (i.e. Hypotheses 5a and 5b). As they constituted part of the measures of broad experience and deep experience, they were excluded from the tests examining Hypotheses 1a to 4b.

3.3.3 Checks for Common Method Bias

As our survey data may be prone to common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), we took a number of steps to assure ourselves that such biases did not pose a significant threat to our analyses. These included, as already mentioned in Chapter 2, obtaining separate supervisory ratings of respondents' idea generation characteristics from one of the companies to establish convergent validity for the idea set measures.

Additionally, we investigated the threat posed by common method variance within the mail survey by subjecting the data to a Harman one-factor test. We conducted principal component analysis on all items making up our independent and dependent variables. Eight components were found with eigenvalues greater than 1.00. In total, these explained 59 percent of the variance, with the first factor accounting for only 22 percent of the total variance. If common method bias were a serious problem in our data, one factor accounting for most of the covariance in the independent and dependent variables should have emerged (Podsakoff et al., 2003). Ultimately, however, we were restricted in the extent to which we could obtain multi-source data by the intra-personal nature of the phenomenon being investigated and the need to work with company access constraints (such that we caused minimal disturbance to employees).

3.3.4 Analytical Approach

We tested the hypotheses using seemingly unrelated regression (SUR) (Zellner, 1962). SUR was chosen instead of separate ordinary least squares (OLS) regressions to allow for the possible correlation between the error terms in the models explaining idea set novelty and idea set volume, and to enable joint tests of the coefficients. VIF indices³⁴ were well below common thresholds (typically recommending VIF's below 10) (Cohen et al., 2002) for variance inflation and thus indicated that multicollinearity was not of significant concern to the analyses.

³⁴ Mean VIF values across the analyses were around 1.50. The highest VIF value attained for any single variable was 6.23.

3.4 Findings

Means, standard deviations, and correlations amongst the variables are shown in Table 3-2. On average, the knowledge workers in our sample have been working for close on 16 years, of which about 10 years have been spent in the participating company, and 4 years in their current job. Males make up 65 percent of the sample, and 6 and 10 percent reported having started their own business or started a new corporate venture, respectively.

Tables 3-3 and 3-4 show the results of the SUR analyses regressing idea set novelty and idea set volume, respectively, on the individual knowledge and exposure to stimuli variables. Table 3-5 then displays the results of post-hoc chi-squared tests for the differences between the coefficients of each of these independent variables across the idea set novelty and idea set volume models. These coefficients are then plotted in Figures 3-3 (a-h) of Appendix 3-B (using unstandardized coefficients to reflect first- and second-order terms for each independent variable). In combination, the analyses shown in Tables 3-3, 3-4 and 3-5 permit the examination of Hypotheses 1 to 4.

Hypotheses 1a and 1b predict that broad knowledge will be positively associated with both the novelty and volume of ideas generated by a knowledge worker in a large, established firm. In addition, H1c predicts that broad knowledge will be more significantly associated with idea set volume than with idea set novelty. In respect of idea set novelty, Model 5 of Table 3-3 indicates that the coefficient for broad knowledge is negative but not significant ($\beta = -.03$, $p = .32$). No support is thus provided for Hypothesis 1a. In respect of idea set volume, Model 5 of Table 3-4 indicates that the coefficient for broad knowledge is positive and significant ($\beta = .07$, $p = .04$). Hypothesis 1b is thus supported. These coefficients are also significantly different from each other (broad knowledge: χ^2 , $df(1) = 2.48$, $p = .06$), albeit only marginally so. Hypotheses 1b and 1c are thus supported (weakly in the case of H1c), while Hypothesis 1a is not.

While not hypothesized, we included a squared term for the knowledge breadth variable in each of the models, to check that inverted U-shaped (or similarly constituted curvilinear) effects do not more accurately describe the relationships between the variables at hand. These analyses indicated the coefficient for the squared term between broad knowledge and idea set novelty to be negative and marginally significant ($\beta = -.07$, $p = .07$). For idea set volume, the

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Dependent Variable																
1. Idea set novelty	3.86	1.20														
2. Idea set volume	2.15	0.67	.57													
Independent Variables																
3. Broad knowledge	1.85	.46	.16	.27												
4. Deep knowledge	9.51	6.81	-.12	-.16	-.28											
5. Broad exposure to stimuli	4.10	1.04	.46	.47	.21	-.08										
6. Deep exposure to stimuli	4.51	1.26	.06	-.02	-.05	.09	.01									
7. Equivocality	2.66	.64	.15	.06	-.04	.01	.03	.08								
Control Variables																
8. Gender ^b	.65	-	.23	.17	.07	.17	.15	.02	.07							
9. Number of reports	3.08	4.878	.05	.05	.05	.22	-.06	.01	.05	.08						
10. Education ^c	2.66	0.80	.17	.15	-.09	-.21	.18	.07	.04	.10	-.07					
11. Creative personality scale	5.23	3.23	.44	.36	.17	-.14	.37	.02	.06	.10	.02	.09				
12. Started new company ^d	.06	-	.16	.16	.20	-.01	.18	-.03	-.00	.05	.02	.00	.09			
13. Started corporate venture ^e	.10	-	.23	.24	.22	-.07	.23	-.10	.11	.12	-.02	.06	.14	.16		
14. Performance management	4.83	1.03	.14	.28	.15	-.10	.36	.11	-.15	.03	-.03	.05	.13	.07	.08	
15. Social context	4.27	0.98	.08	.12	.09	-.01	.26	.09	-.30	.05	.05	-.01	.07	.07	-.02	.55
16. Company support for innovation	4.94	1.28	.23	.33	.10	.04	.36	.01	-.17	.12	-.01	.01	.16	.15	.00	.51
17. Functional area 1	.07	-	-.01	-.03	.00	.05	-.10	-.10	.08	.07	.39	-.09	.03	.02	-.05	-.04
18. Functional area 2	.03	-	-.14	-.09	-.06	.07	-.04	-.11	-.01	-.02	-.05	-.15	-.04	.01	-.06	-.20
19. Functional area 3	.02	-	.13	.19	.137	.04	.11	-.15	.03	.06	.06	.03	.04	-.03	.20	.01
20. Functional area 4	.49	-	-.09	-.17	-.30	.15	-.30	.24	.07	.04	-.01	.11	-.16	-.05	-.06	-.26
21. Country (United States)	.13	-	.05	.07	.09	-.07	.15	-.12	-.05	-.14	.03	.01	.19	.03	.09	.02
22. Country (Asia/Middle East)	.02	-	.03	-.06	-.02	.07	.03	.04	.03	.01	-.04	.00	-.09	-.03	.03	.00
23. Country (The Netherlands)	.20	-	.07	-.02	-.07	.13	.08	-.02	.07	.10	.07	.16	.04	-.02	.01	-.13
24. Country (Rest of Europe)	.09	-	.05	.06	-.11	-.03	.13	.02	-.01	.09	-.03	.19	.02	.04	-.07	.03
25. Country (Other)	.04	-	.03	.10	.01	-.04	.09	.05	-.03	.03	-.04	.01	-.02	-.05	.11	.13
26. Company 1	.28	-	.08	-.05	-.06	.18	.12	-.02	.09	.07	.11	.08	-.01	-.03	.03	-.18
27. Company 2	.44	-	.21	.39	.18	-.23	.39	.00	-.15	.00	-.13	.17	.26	.09	.09	.50

Table 3-2 Means, Standard Deviations, and Correlations

^a n = 388 (knowledge workers) ^b Dummy variable (1 = male) ^c Dummy variable (1 = started new company) ^d Dummy variable (1 = started new corporate venture)
All correlations greater than or equal to .14 are significant at the 0.01 level (2-tailed); correlations greater than or equal to .10 are significant at the 0.05 level (2-tailed).

Variable	15	16	17	18	19	20	21	22	23	24	25	26
16. Company support for innovation	.44											
17. Functional area 1	-.01	-.06										
18. Functional area 2	-.09	-.10	-.04									
19. Functional area 3	.03	-.05	-.27	-.03								
20. Functional area 4	-.14	-.11	-.05	-.18	-.13							
21. Country (United States)	-.08	-.02	-.03	-.07	.06	-.12						
22. Country (Asia/Middle East)	.01	-.08	.04	-.02	.14	-.12	-.05					
23. Country (The Netherlands)	-.05	-.05	-.08	.05	.08	.01	-.20	-.06				
24. Country (Rest of Europe)	-.05	.04	-.05	-.06	-.04	.21	-.12	-.04	-.16			
25. Country (Other)	.06	.06	.03	-.04	-.03	-.14	-.08	-.02	-.10	-.06		
26. Company 1	-.08	-.12	-.24	.01	.13	-.05	.08	.16	.81	-.17	-.06	
27. Company 2	.18	.45	-.04	-.16	-.04	-.12	.16	-.07	-.44	.33	.16	-.55

Table 3-2 Means, Standard Deviations, and Correlations (Cont.)

Idea Set Novelty															
	Model 1			Model 2			Model 3			Model 4			Model 5		
Intercept	3.575	.243	***	3.676	(.227)	***	3.436	(.207)	***	3.385	(.229)	***	3.641	(.223)	***
<i>Control Variables</i>															
Company 1	.565	(.305)	+	.604	(.300)	*	.229	(.262)		.639	(.301)	*	.250	(.271)	
Company 2	.492	(.226)	*	.432	(.224)	*	.387	(.215)	+	.577	(.222)	**	.327	(.211)	
Country (United States)	-.435	(.232)	+	-.468	(.226)	*	-.474	(.191)	**	-.423	(.231)	+	-.496	(.197)	**
Country (Asia/Middle East)	-.161	(.473)		-.155	(.478)		.011	(.292)		-.279	(.463)		-.320	(.336)	
Country (The Netherlands)	-.178	(.293)		-.216	(.294)		-.055	(.247)		-.158	(.288)		-.104	(.247)	
Country (Rest of Europe)	-.082	(.219)		.024	(.213)		-.195	(.189)		-.022	(.206)		-.066	(.188)	
Country (Other)	-.202	(.251)		-.195	(.241)		-.178	(.218)		-.167	(.246)		-.279	(.223)	
Performance management	-.045	(.106)		-.018	(.103)		-.114	(.103)		-.096	(.111)		-.119	(.101)	
Social context	.049	(.075)		.026	(.072)		-.022	(.075)		.042	(.076)		-.023	(.069)	
Company support for innovation	-.017	(.086)		-.008	(.084)		-.046	(.079)		.002	(.081)		-.055	(.078)	
Gender	.129	(.136)		.158	(.135)		.078	(.129)		.113	(.136)		.128	(.129)	
Number of reportees	.041	(.067)		.034	(.062)		.052	(.059)		.024	(.065)		.064	(.054)	
Education	.064	(.064)		.056	(.064)		.043	(.059)		.039	(.065)		.007	(.059)	
Creative personality	.399	(.064)	***	.433	(.065)	***	.311	(.062)	***	.375	(.064)	***	.325	(.062)	***
Functional area 1	.139	(.227)		.101	(.225)		.451	(.223)	*	.222	(.230)		.316	(.227)	
Functional area 2	-.129	(.435)		-.250	(.459)		-.196	(.459)		-.130	(.463)		-.407	(.448)	
Functional area 3	.779	(.456)	+	.574	(.450)		.636	(.402)		.741	(.454)	+	.759	(.413)	
Functional area 4	-.065	(.149)		-.087	(.150)		.152	(.136)		-.108	(.154)		.030	(.139)	
Started new company	.231	(.199)		.079	(.204)		-.079	(.169)		.205	(.203)		-.034	(.178)	
Started corporate venture	.499	(.226)	*	.453	(.220)	*	.227	(.172)		.488	(.219)	*	.243	(.177)	
Broad knowledge	-.006	(.068)											-.033	(.067)	
Broad knowledge ²	-.085	(.052)	*										-.070	(.047)	+
Deep knowledge				.191	(.117)	+							.101	(.113)	
Deep knowledge ²				-.214	(.074)	**							-.158	(.078)	*
Broad exposure to stimuli							.647	(.106)	***				.630	(.100)	***
Broad exposure to stimuli ²							.204	(.102)	*				.178	(.097)	**
Deep exposure to stimuli										.119	(.069)	*	.108	(.066)	*
Deep exposure to stimuli ²										.071	(.067)		.061	(.067)	
F-Value	4.07		***	4.58		***	6.40		***	4.18		***	5.75		***
Adjusted R ²	.27			.30			.37			.28			.41		
R ²	.21			.23			.31			.21			.34		

Table 3-3 Seemingly Unrelated Regression Tests for Idea Set Novelty

n = 388. Standardized regression coefficients reported. Robust standard errors in parentheses. One-sided tests for hypothesized variables, two-sided tests for control variables. The comparison dummy variable for functional area was marketing and sales; the comparison dummy variable for country was the United Kingdom.

*** p<.001 ** p<.01 * p<.05 + p<.10

	Idea Set Volume														
	Model 1			Model 2			Model 3			Model 4			Model 5		
Intercept	1.881	(.123)	***	2.032	(.123)	***	2.022	(.124)	***	1.991	(.127)	***	2.020	(.134)	***
<i>Control Variables</i>															
Company 1	.358	(.160)	*	.354	(.169)	*	.206	(.165)		.328	(.161)	+	.213	(.166)	
Company 2	.493	(.131)	***	.443	(.134)	***	.421	(.138)	**	.490	(.133)	***	.356	(.137)	**
Country (United States)	-.298	(.125)	*	-.321	(.132)	*	-.325	(.131)	**	-.298	(.129)	*	-.316	(.122)	**
Country (Asia/Middle East)	-.474	(.292)	+	-.604	(.291)	*	-.577	(.286)	*	-.558	(.292)	+	-.424	(.301)	
Country (The Netherlands)	-.098	(.163)		-.153	(.168)		-.087	(.161)		-.117	(.162)		-.079	(.163)	
Country (Rest of Europe)	-.198	(.134)		-.190	(.134)		-.278	(.133)	*	-.241	(.131)	+	-.216	(.143)	
Country (Other)	.121	(.188)		.036	(.183)		.037	(.166)		.044	(.183)		.098	(.174)	
Performance management	.054	(.052)		.067	(.052)		.043	(.052)		.060	(.054)		.056	(.052)	
Social context	-.024	(.039)		-.024	(.039)		-.038	(.040)		-.019	(.040)		-.049	(.038)	
Company support for innovation	.056	(.043)		.052	(.044)		.026	(.043)		.048	(.044)		.043	(.042)	
Gender	.005	(.076)		.055	(.078)		.014	(.076)		.023	(.077)		.025	(.076)	
Number of reportees	.028	(.040)		.051	(.043)		.042	(.043)		.041	(.043)		.038	(.042)	
Education	.064	(.034)	+	.048	(.033)		.050	(.032)		.064	(.034)	+	.051	(.032)	
Creative personality	.139	(.036)	***	.155	(.038)	***	.122	(.038)	***	.150	(.037)	***	.126	(.039)	***
Functional area 1	.094	(.134)		-.013	(.136)		.074	(.146)		.033	(.141)		.098	(.140)	
Functional area 2	.129	(.244)	**	.020	(.253)		-.001	(.253)		.089	(.253)		.021	(.245)	
Functional area 3	.761	(.257)		.867	(.276)	**	.873	(.277)	**	.898	(.284)	**	.734	(.261)	**
Functional area 4	-.074	(.085)		-.145	(.085)	+	-.065	(.084)		-.136	(.085)		-.012	(.089)	
Started new company	.146	(.108)		.207	(.099)	*	.176	(.109)		.218	(.103)	*	.070	(.177)	
Started corporate venture	-.041	(.140)		-.009	(.133)		-.041	(.123)		.0117	(.134)		-.096	(.124)	
Broad knowledge	.083	(.038)	*										.069	(.039)	*
Broad knowledge ²	.058	(.029)	*										.065	(.026)	**
Deep knowledge				.011	(.062)								.013	(.061)	
Deep knowledge ²				-.070	(.038)	*							-.063	(.040)	+
Broad exposure to stimuli							.209	(.062)	***				.205	(.058)	***
Broad exposure to stimuli ²							-.035	(.049)					-.044	(.047)	
Deep exposure to stimuli										-.005	(.035)		-.004	(.034)	
Deep exposure to stimuli ²										-.024	(.033)		-.015	(.030)	
F-Value	6.11		***	5.92		***	6.24		***	5.59		***	5.51		***
Adjusted R ²	.36			.36			.37			.34			.40		
R ²	.30			.30			.31			.28			.33		

Table 3-4 Seemingly Unrelated Regression Tests for Idea Set Volume

n = 388. Standardized regression coefficients reported. Robust standard errors in parentheses. One-sided tests for hypothesized variables, two-sided tests for control variables. The comparison dummy variable for functional area was marketing and sales; the comparison dummy variable for country was the United Kingdom.

*** p<.001 ** p<.01 * p<.05 + p<.10

	Idea Set Novelty Coefficient	Idea Set Volume Coefficient	χ^2 diff	p
Broad knowledge	-.033	.069	2.48	+
Broad knowledge ²	-.070	.065	9.09	***
Deep knowledge	.101	.013	0.60	
Deep knowledge ²	-.158	-.063	1.97	+
Broad exposure to stimuli	.630	.205	20.08	***
Broad exposure to stimuli ²	.178	-.044	5.69	**
Deep exposure to stimuli	.108	-.004	4.06	*
Deep exposure to stimuli ²	.061	-.015	1.87	+

Table 3-5 Chi-Squared Tests for Differences in the Coefficients of Idea Set Novelty and Idea Set Volume

n = 388. Standardized regression coefficients reported. One-sided tests used with df = 1.

*** p<.001 ** p<.01 * p<.05 + p<.10

squared breadth of knowledge term was positive and significant ($\beta = .06$, $p = .01$). These coefficients are also significantly different from each other (χ^2 , $df(1) = 9.09$, $p = .001$). The visual plots of these coefficients (refer to Figures 3-3 a & b) aid their interpretation: broad knowledge shows a (truncated) inverted U-shaped relationship with idea set novelty, but an exponentially increasing (positive) relationship with idea set volume.

Hypotheses 2a and 2b posit an inverted U-shaped relationship between depth of knowledge, and the novelty and volume of a knowledge worker's ideas. In respect of idea set novelty, Model 5 of Table 3-3 indicates that the coefficient for deep knowledge is positive but not significant ($\beta = .10$, $p = .19$), while the coefficient for the squared term is negative and significant ($\beta = -.18$, $p = .02$). Hypothesis 2a is thus partially supported. In respect of idea set volume, Model 5 of Table 3-4 indicates that the coefficient for deep knowledge is positive but not significant ($\beta = .01$, $p = .42$), while the squared term is negative and marginally significant ($\beta = -.06$, $p = .06$). Limited support is thus provided for Hypothesis 2b. As the interpretation of these regression terms is somewhat complicated, however, by the non-significant first-order coefficients, it is worth confirming these relationships using the visual plots thereof in Figures 3-3 (c & d). These indicate (truncated) initially positive relationships between deep knowledge and both idea set dimensions, followed by negative relationships, that is: inverted U-shaped relationships, truncated at low levels of knowledge depth.

Hypothesis 2c predicts that deep knowledge will be more significantly associated with idea set volume than idea set novelty. There is no support for this hypothesis, however, as the

difference between the deep knowledge coefficients for idea set novelty and idea set volume (χ^2 , $df(1) = 0.60$, $p = .22$) is not significant, while the difference between the squared term coefficients (χ^2 , $df(1) = 1.97$, $p = .08$) is only marginally significant and contrary to the expected direction. In other words, very high levels of deep knowledge appear to impact both idea set novelty and idea set volume negatively, but more significantly so in the instance of idea set novelty.

Hypotheses 3a and 3b posit an inverted U-shaped relationship between breadth of exposure to stimuli, and the novelty and volume of a knowledge worker's ideas. In respect of idea set novelty, Model 5 of Table 3-3 indicates that the coefficient for broad exposure is positive and significant ($\beta = .63$, $p = .00$), as is the coefficient for the squared term ($\beta = .18$, $p = .04$). Hypothesis 3a is thus not supported. Rather, as demonstrated visually in Figure 3-3e, the relationship between broad stimuli and idea set novelty is an exponentially increasing (positive) one. In respect of idea set volume, Model 5 of Table 3-4 indicates that the coefficient for broad exposure is positive and significant ($\beta = .20$, $p = .00$), while coefficient for the squared term is negative but not significant ($\beta = -.04$, $p = .18$). Hypothesis 3b is thus partially supported. Figure 3-3f further clarifies the nature of this relationship, viz. a positive relationship between breadth of exposure to stimuli and idea set volume, which flattens off at very high levels of breadth of exposure to stimuli. Hypothesis 3c predicts that breadth of exposure will be more significantly associated with idea set novelty than idea set volume. The difference between the broad exposure coefficients for idea set novelty and idea set volume (χ^2 , $df(1) = 20.08$, $p = .000$) is highly significant in the expected direction, as is the difference between the squared term coefficients (χ^2 , $df(1) = 5.69$, $p = .01$). Hypothesis 3c is thus supported.

Hypotheses 4a and 4b posit an inverted U-shaped relationship between depth of exposure to stimuli, and the novelty and volume of a knowledge worker's ideas. In respect of idea set novelty, Model 5 of Table 3-3 indicates that the coefficient for deep exposure is positive and significant ($\beta = .11$, $p = .05$). The coefficient for the squared deep exposure term is positive but not significant ($\beta = .06$, $p = .18$). In respect of idea set volume, Model 5 of Table 3-4 indicates that the coefficient for deep exposure is negative but not significant ($\beta = -.04$, $p = .17$), as is the coefficient for the squared term ($\beta = -.00$, $p = .45$).

Once again, as the direct interpretation of these regression terms is somewhat complicated, it is worth confirming these relationships using the visual plots thereof in Figures 3-3 (g & h). These indicate a moderate (and truncated on both ends) U-shaped relationship between depth of exposure to stimuli and idea set novelty, but an inverted U-shaped relationship for idea set volume (also truncated on both ends, and of only moderate strength). Hypothesis 4a is thus not supported, while some support is offered for Hypothesis 4b.

Hypothesis 4c predicts that depth of exposure will be more significantly associated with idea set novelty than idea set volume. The difference between the deep exposure coefficients for idea set novelty and idea set volume (χ^2 , $df(1) = 4.06$, $p = .02$) is significant in the expected direction, as is the (marginally significant) difference between the squared term coefficients (χ^2 , $df(1) = 1.87$, $p = .09$). Hypothesis 4c is thus supported.

The fifth set of hypotheses were concerned with equivocality-reducing transformative thinking processes as a potential mediating mechanism between the antecedent variable of broad exposure to stimuli and idea set outcomes (viz. idea set novelty and idea set volume)³⁵. Hypothesis 5a predicted that equivocality-reducing transformative thought processes would partially mediate between broad exposure to stimuli and idea set novelty. We use equivocality as an indicator of transformative knowledge processing by an individual. We have already established that the independent variable (here, broad exposure) influences the dependent variable (idea set novelty) (see model 3 of Table 3-3). We hence needed to check the remaining steps for mediation, as outlined by Baron and Kenny (1986). These steps are displayed in Table 3-6. First, model 1 indicates that the independent variable (broad exposure) influences the mediator (equivocality) ($\beta = .16$, $p = .005$). Second, model 2 indicates that the mediator (equivocality) influences the dependent variable (idea set novelty) ($\beta = .25$, $p = .004$). Lastly, when controlling for the independent variable (broad exposure), the mediator (equivocality) still influences the dependent variable (idea set novelty) ($\beta = .16$, $p = .03$). Hence, equivocality does

³⁵ As a robustness check, we also conducted SUR analyses to test for the alternative (or supplementary) possibility that equivocality may act as a moderating variable between broad exposure to stimuli, and idea set novelty and volume. However, these analyses indicated that the multiple interaction between broad stimuli and equivocality, and idea set novelty ($\beta = -.03$, $p = .52$) and idea set volume ($\beta = -.028$, $p = .38$) did not attain significance. Hence, our analyses support our propositions regarding equivocality (as a proxy for knowledge transformation processes) acting as a mediator, rather than moderator, between these variables.

act as a mediating mechanism between broad exposure and idea set novelty, providing support for Hypothesis 5a. Also, as anticipated, this mediation effect is only partial as the effect of broad exposure on idea set novelty remains significant in the final step ($\beta = .67, p = .000$).

	Model 1: Equivocality			Model 2: Idea Set Novelty			Model 3: Idea Set Novelty		
Intercept	2.69	(.12)	***	2.85	(.32)	***	3.30	(.29)	***
<i>Control Variables</i>									
Company 1	.03	(.19)		.73	(.28)	**	.30	(.25)	
Company 2	-.30	(.13)	*	.39	(.20)	*	.09	(.19)	
Country (United States)	-.19	(.13)		-.26	(.20)		-.30	(.17)	+
Country (Asia/Middle East)	.14	(.30)		.20	(.45)		.30	(.35)	
Country (The Netherlands)	-.12	(.18)		-.41	(.28)		-.30	(.24)	
Country (Rest of Europe)	-.01	(.14)		-.07	(.21)		-.20	(.18)	
Country (Other)	.04	(.19)		-.02	(.25)		-.01	(.24)	
Performance management	.08	(.05)	+	-.06	(.09)		-.10	(.08)	
Social context	-.24	(.04)	***	.07	(.08)		-.01	(.08)	
Company support for innovation	-.04	(.04)		.14	(.07)	+	.09	(.07)	
Gender	.01	(.07)		.28	(.12)	*	.20	(.11)	+
Years in job	-.02	(.01)	*	-.01	(.02)		-.02	(.01)	
Years in company	.00	(.01)		.01	(.01)		.01	(.01)	
Years working	.01	(.01)		-.02	(.01)		-.01	(.01)	
Number of reportees	-.02	(.04)		-.04	(.06)		-.04	(.05)	
Education	.02	(.04)		.04	(.06)		.00	(.06)	
Creative personality	.06	(.04)		.41	(.06)	***	.32	(.06)	***
Functional area 1	.16	(.16)		.21	(.22)		.38	(.22)	+
Functional area 2	-.05	(.21)		-.51	(.35)		-.70	(.33)	*
Functional area 3	.12	(.27)		.87	(.39)	*	.81	(.35)	*
Functional area 4	.15	(.09)	+	-.01	(.13)		.22	(.12)	+
Started new company	.00	(.14)		.50	(.18)	**	.31	(.17)	+
Started corporate venture	.07	(.11)		.43	(.15)	**	.24	(.13)	+
Broad exposure to stimuli	.16	(.06)	**				.67	(.09)	***
Equivocality				.25	(.09)	**	.16	(.08)	*
F-Value	3.03		***	7.16		***	10.13		***
Adjusted R ²	.18			.35			.44		
R ²	.12			.30			.397		

Table 3-6 SUR Tests for Mediation of Equivocality between Broad Exposure to Stimuli and Idea Set Novelty

n = 388. Standardized regression coefficients reported. Robust standard errors in parentheses. One-sided tests for hypothesized variables, two-sided tests for control variables.

*** p<.001 ** p<.01 * p<.05 + p<.10

Table 3-7 reflects the results of parallel tests examining whether equivocality mediates between broad exposure to stimuli and idea set volume. These tests provide indirect support for the proposition that, as predicted by Hypothesis 5b, equivocal thought processes do not mediate between these variables. Rather, knowledge combination processes which are not reliant on triggering by equivocal informational environments are hypothesised to account for idea set volume. Indeed, the mediator (equivocality) fails to significantly influence the dependent

variable (idea set volume) ($\beta = .05$, $p = .16$) when controlling for the independent variable (broad exposure), as shown in model 3 of Table 3-7.

	Model 1: Equivocality			Model 2: Idea Set Volume			Model 3: Idea Set Volume		
Intercept	2.69	(.12)	***	1.71	(.16)	***	1.85	(.17)	***
<i>Control Variables</i>									
Company 1	.03	(.19)		.37	(.15)	**	.24	(.15)	+
Company 2	-.30	(.13)	*	.45	(.11)	***	.36	(.11)	***
Country (United States)	-.19	(.13)		-.24	(.12)	*	-.26	(.11)	*
Country (Asia/Middle East)	.14	(.30)		-.33	(.26)		-.30	(.27)	
Country (The Netherlands)	-.12	(.18)		-.21	(.15)		-.18	(.15)	
Country (Rest of Europe)	-.01	(.14)		-.15	(.12)		-.20	(.12)	+
Country (Other)	.04	(.19)		.15	(.17)		.15	(.16)	
Performance management	.08	(.05)	+	-.02	(.04)		-.03	(.04)	
Social context	-.24	(.04)	***	-.01	(.04)		-.04	(.04)	
Company support for innovation	-.04	(.04)		.12	(.04)	***	.10	(.04)	**
Gender	.01	(.07)		.06	(.06)		.04	(.06)	
Number of reportees	-.02	(.01)	*	-.01	(.01)		-.01	(.01)	
Years in job	.00	(.01)		.01	(.01)		.00	(.00)	
Years in company	.01	(.01)		-.01	(.01)		-.01	(.00)	
Years working	-.02	(.04)		.04	(.04)		.04	(.04)	
Education	.02	(.04)		.02	(.03)		.01	(.03)	
Creative personality	.06	(.04)		.16	(.03)	***	.13	(.03)	***
Functional area 1	.16	(.16)		.07	(.13)		.13	(.13)	
Functional area 2	-.05	(.21)		-.10	(.19)		-.16	(.18)	
Functional area 3	.12	(.27)		.83	(.30)	**	.81	(.31)	**
Functional area 4	.15	(.09)	+	-.05	(.07)		.03	(.07)	
Started new company	.00	(.14)		.34	(.09)	***	.28	(.10)	***
Started corporate venture	.07	(.11)		.15	(.09)	+	.10	(.09)	
Broad exposure to stimuli	.16	(.06)	**				.22	(.05)	***
Equivocality				.08	(.05)	*	.05	(.05)	
<i>F-Value</i>	3.03		***	8.31		***	9.12		***
<i>Adjusted R²</i>	.18			.38			.42		
<i>R²</i>	.12			.34			.37		

Table 3-7 SUR Tests for Mediation of Equivocality between Broad Exposure to Stimuli and Idea Set Volume

$n = 388$. Standardized regression coefficients reported. Robust standard errors in parentheses. One-sided tests for hypothesized variables, two-sided tests for control variables.

*** $p < .001$ ** $p < .01$ * $p < .05$ + $p < .10$

Furthermore, a chi-squared test for differences between the equivocality coefficients across the regressions on idea set novelty and idea set volume indicated this difference to be significant ($\chi^2 = 4.23$, $p = .02$). This indicates that equivocality-reducing information processes are more significantly associated with the novelty (as opposed to the volume) of a person's ideas in large, established companies.

The findings from all the analyses reported above are synthesized in Table 3-8³⁶.

Effect on Idea Set Novelty and Idea Set Volume		
Broad knowledge	Novelty	• Inverted U-shaped relationship (truncated and insignificant at low levels of knowledge breadth)
	Volume	• Positive effect on volume
	Comparison	• Simple effects greater for volume; effects about equal strength (but opposite directions) for very high levels of broad knowledge.
Deep knowledge	Novelty	• Inverted U-shaped effect on novelty (truncated at low levels of knowledge depth)
	Volume	• Inverted U-shaped effect on volume (but simple term not significant)
	Comparison	• No difference for simple effects; (negative) squared effects stronger for novelty.
Broad exposure to stimuli	Novelty	• Positive effect on novelty
	Volume	• Positive effect on volume, which flattens out at higher levels of broad exposure
	Comparison	• Effects greater for idea set novelty than idea set volume.
Deep exposure to stimuli	Novelty	• Weakly (and truncated on both ends) U-shaped relationship
	Volume	• Weakly (and truncated on both ends) inverted U-shaped relationship
	Comparison	• Effects greater for idea set novelty than idea set volume.
Equivocality	Comparison	• Mediating effect found between deep exposure, equivocality and novelty, but not for volume.

Table 3-8 Summary of Findings for Idea Set Novelty and Idea Set Volume

3.5 Discussion and Conclusions

Our primary intention in this chapter was to demonstrate the practical utility of the idea set construct and instrument to better understanding the antecedents of idea generation in dispersed, corporate contexts. Accordingly, the analysis presented in the chapter supports this proposition, suggesting that through identifying and measuring different dimensions characterizing ideas one can obtain a more nuanced understanding of commonalities and differences in the origin of different types or features of ideas in corporate settings. In addition, the information processing lens (Ocasio, 1997; Simon, 1947, 1979, 1997) we adopted here appears useful to explicating these commonalities and differences in the origins of corporate entrepreneurial ideas.

³⁶ The findings reported here relate to the separate models in the relevant analyses where these indicate a variable to be significant when entered on its own but not in the relevant full model. We follow this approach (cf. Katila & Ahuja, 2002) to minimise the impact of non-significant findings in the full models on our interpretation of findings for the individual variables.

Our analyses indicate, uniquely we believe, that idea set novelty and idea set volume are impacted (in part at least) by different antecedents and knowledge processes. Given that volume and novelty are probably the most widely used dimensions along which innovations or ideas are described, this finding is of particular interest and significance. Idea (or opportunity, as may be the case) novelty and volume are seldom investigated together (Shalley, 1995; Shepherd & De Tienne, 2005; and Ucbasaran, Westhead, & Wright, 2008, presenting rare exceptions). Hence, this research study advances existing literature which is presently little able to draw systematic inferences regarding commonalities or differences in the origins of how many versus how novel the ideas generated by corporate knowledge workers are.

Our findings indicate that a number of distinctive antecedents to idea set novelty versus idea set volume are to be found in individual knowledge and exposure to contextual stimuli of corporate knowledge workers. In particular, we found that possessing a broad knowledge base was associated more with the volume of ideas generated than with their novelty, whilst exposure to broad and deep stimuli were both more strongly related to the novelty of ideas. Furthermore, different knowledge processes help account for idea set novelty and volume. In this regard, idea set novelty appears to involve cognitive processes of knowledge transformation (Koestler, 1942; Mumford & Gustafson, 1988), triggered by equivocal thought processes associated with diverse contextual stimuli. Idea set volume, to the contrary, while still facilitated by broad exposure to stimuli, was not triggered by equivocality and was rather explained by knowledge combination (Fleming, 2001; Katila & Ahuja, 2002; Nelson & Winter, 1982; Schumpeter, 1934) processes.

Taken together, these differences between the antecedents of idea set novelty and volume may indicate, on the one hand, that broad prior knowledge is critical to being able to absorb incoming information and to make 'connections' with existing knowledge stocks (akin to the role of absorptive capacity at the firm-level; Cohen & Levinthal, 1990) to identify possible new resource combinations. The more connections (Shepherd & De Tienne, 2005) that can be made with existing knowledge, the more the ideas that a corporate knowledge worker can generate. On the other hand, exposure to new stimuli – of both diverse boundary-crossing and deep functional natures - seems critical to triggering the more fluid, transformative processing that differentiates more from less creative ideas. Indeed, literature on attention (Fiske & Taylor, 1991) indicates the importance of new stimuli for stimulating attentional and processing

processes. The heightened salience of new stimuli (Fiske & Taylor, 1991), especially when embedded within equivocal informational environments (Huber & Daft, 1987), ‘stimulates’ more extensive sense-making amongst corporate knowledge workers. More extensive sense-making, potentially including higher levels of dissonance reduction (Festinger, 1957), in turn carries with it a greater chance of producing novel creative outputs.

A number of interesting findings were also evident for the individual antecedents we theorised and tested. Our field methods enabled us to test more knowledge- and cognition-based antecedents than has, as far as we know, occurred previously. One particularly interesting set of findings relates to the pattern of curvilinear effects. Unexpectedly, knowledge antecedents demonstrated more curvilinear relationships with idea set novelty and volume, than did exposure to stimuli. Specifically, very high levels of knowledge (both broad knowledge and deep knowledge) reduced idea set novelty, as did deep experience for idea set volume. Additionally, some evidence for broad knowledge possessing inverted U-shaped relationships with the idea set characteristics was provided. Regarding exposure to stimuli, however, curvilinear effects were more limited in strength. While this may indicate range restriction in the study (cf. Katila & Ahuja, 2002), it may alternatively suggest two possible explanations which warrant further investigation. These alternatives are that: (a) more extensive exposure to stimuli has a consistently positive effect on idea set volume and (especially) idea set novelty; or (b) that individuals and organizations act to restrict the stimuli corporate knowledge workers are exposed to within manageable levels, thereby avoiding cognitive overload.

We turn next to briefly identifying a number of implications for theory and practice.

3.5.1 Implications for Theory

Our earlier review of the entrepreneurship opportunity recognition, technological search and organizational creativity streams of literature indicates that none currently focuses directly on the corporate recognition of entrepreneurial opportunities (refer to Section 1.4.1 titled ‘Dispersed Opportunity Recognition in Large, Established Companies’). Each has, however, made considerable inroads into understanding at least one central construct, or relationship, germane to this topic. Our findings indicate that there is considerable scope for the development of a theory of corporate opportunity recognition that draws on, and extends, the work of these

streams. They suggest that a combination of individual, contextual and process factors helps explain idea characteristics. Whilst not a particularly novel proposition in itself, given that we know behavior in organizations to be affected by both contextual and individual factors (Magnusson, 1981), this has been neglected by both the technological search and opportunity recognition literatures, and (until recently) by the organizational creativity literature (Mumford, 2003).

For the entrepreneurial opportunity recognition literature, the analyses suggest a need to remedy its current neglect of contextual factors and its limited efforts to operationally distinguish opportunity dimensions (Dimov, 2004, 2007a). Additionally, it may wish to go beyond its focus merely on independent entrepreneurs (and often just on business founders; Gaglio, 2004; Ucbasaran et al., 2003, 2008) in its investigation of opportunity perception processes and antecedents. In fact, corporations may provide one rather valuable, more ‘controlled’ context than that of independent venturing in which to examine opportunity recognition and its antecedents. Given burgeoning research in the opportunity recognition domain (Corbett, 2007; Ireland & Webb, 2007), it would be rather disappointing if the chance to incorporate contextual factors into an understanding of the origins of variation was missed. Alongside recent endeavours to examine social factors in opportunity recognition (Arenius & De Clerq, 2005; Ozgen & Baron, 2007), this study suggests that an information processing approach (which incorporates both social and non-social stimuli) to context may help advance theory development.

Of particular importance to the technological search literature seem to be the findings of the impact of prior knowledge on innovation, and the somewhat different patterns of findings when considering both breadth and depth of search distance (cf. Laursen & Salter, 2006). In addition, by focusing on ‘innovative performance’ outcome variables that emphasise the volume of innovations generated by a firm, this stream of literature currently places important (but implicit) boundary conditions on its generalizability. Regarding the issue of prior knowledge, while the patent citation methods that typify this research stream may limit the extent to which it can distinguish between different features of innovations, company experience does seem more amenable to measurement. Indeed, the study previously referred to by Katila and Ahuja (2002) attempts to do exactly that, by examining the company’s citation of its own patents. Finally, in

terms of theory development in the technological search stream, our findings indicate that the probabilistic combinatorial search (or ‘recombinant search’) (Fleming, 2001; Nelson & Winter, 1982; Schumpeter, 1939) processes proposed by technological search theorists may apply more to the volume of innovations generated than their novelty. Accordingly, this stream of research may do well to also consider the possibility of more creative, transformative knowledge processes being at play in innovation, especially if it wishes to extend its analysis beyond counts of firm-level innovations to also address their novelty.

For organizational creativity literature, a particularly important implication stems from the information-processing and knowledge-based perspective taken in the study and supported by its findings. While creativity scholars have typically focused on the motivational influences of contextual factors (Isaksen, 2000-2001; Shalley & Gilson, 2004), this study, following in the Carnegie search tradition, lends support to the role information-processing considerations may also play in providing the raw material necessary for new ideas. A focus on the stimuli that directly enable creativity has been notably lacking in this research stream – for a highly cognitive phenomenon, a predominantly ‘personological’ approach has prevailed (Mumford, 2003). In addition, there is considerable scope for creativity literature to go beyond its limited consideration of domain-relevant knowledge (Amabile, 1998; Amabile et al., 1996; Weisberg, 1999) to better understand the nuanced individual-level factors influencing creativity in organizations.

Furthermore, we would also suggest that qualities of informational environments such as equivocality that have their roots in communication theory (e.g. Daft & Macintosh, 1981; Daft & Lengel, 1986; Dennis & Kinney, 1998; Huber & Glick, 1987), may prove promising to all the reviewed streams in understanding the nature of exactly ‘what’ is processed in ideation.

3.5.2 Implications for Practice

A number of practical implications flow too from these findings. A key implication pertains to the need for organizations to be more sensitive to differing dimensions of employee ideas, as well as to both commonalities and differences in their antecedents. Specifically, the findings suggest that corporations may wish to create somewhat different conditions depending

on the relative balance they wish to achieve between generating many versus highly novel ideas (Mumford & Gustafson, 1988).

Enabling organizational members to be exposed to a broad range of stimuli is a clear and consistent priority should firms wish to enable idea generation, irrespective of the particular form it wishes to encourage. A variety of human resource policies, communication systems and processes may help effect such environments, together with flexible organizational structures and job designs (Kanter, 1988; Shalley & Gilson, 2004). However, firms that wish to generate highly novel ideas should also focus on providing opportunities for professional engagement (such as developing strong functional communities of practice, providing opportunities to attend external professional events, and perhaps encouraging employee sabbaticals) as well creating comfort with equivocality amongst its members: the latter posing a considerable challenge indeed to many risk-averse firms.

Overarchingly, this study suggests a shift in emphasis for organizations, from the typical reliance of large, established firms on focused 'exploratory' units (such as R&D laboratories) to recognizing knowledge workers, in broad, as a meaningful source of new ideas. While we do not suggest that companies should abandon their focused innovative efforts, we suggest that more attention be given to enabling a more balanced, and complementary, approach to idea innovation, utilising both dispersed and focused corporate entrepreneurship strategies.

3.5.3 Conclusion

To conclude, it is evident that the organization and management field still has a considerable way to go in understanding the antecedents and processes, let alone consequences, of new business idea generation in large, established firms. We sought to advance the study of the generation of new business ideas in large, established firms through adopting a unified framework that takes a cognitive, knowledge-based approach to corporate idea generation: a topic tangential to a number of streams of organization and management literature, but central to none. Accordingly, our empirical analyses demonstrated the benefits of simultaneously theorizing and gathering data on individual, contextual and idea variables.

APPENDIX 3-A

NEW MULTI-ITEM MEASURES FOR INDEPENDENT AND CONTROL VARIABLES

The measures below are from the principal survey.

Broad and Deep Knowledge:

Respondents were asked about the diversity of their work experience along a number of dimensions. Response options were, from left to right: '1'; '2'; '3-4'; and '5+'.

- Number of divisions of the company I have worked in
- Number of functional areas I have worked in (e.g. sales, manufacturing)
- Number of companies I have worked in
- Number of countries I have worked in (for more than one month)
- Number of industries I have worked in (e.g. food, telecoms)

Broad Exposure:

Respondents were asked to indicate the extent to which they had contact with specific types of people and issues inside and outside their company. Response options were from '1' (not at all) to '7' (to a very great extent).

- | | |
|--------------------|--|
| Geographic Stimuli | <ul style="list-style-type: none">• My job involves extensive travel to different countries.• I communicate with an international network of people in my discipline.• I routinely deal with issues in a number of countries. |
| Industry Stimuli | <ul style="list-style-type: none">• Compared with my peers in the company, my job brings me into contact with an unusually high variety of industrial sectors.• I am frequently exposed to issues and events in other industry sectors. |
| Internal Stimuli | <ul style="list-style-type: none">• I have much contact with people and issues from other departments.• I have a fairly good understanding of the other departments, and am usually pretty up-to-date with their developments. |
| External Stimuli | <ul style="list-style-type: none">• I work with a wide range of people from outside the company.• My job brings me much contact with customers and other companies.• My job involves much broader exposure to situations and people from outside the company than do most jobs at my level. |
| Functional Breadth | <ul style="list-style-type: none">• My work spans a number of different functional disciplines.• It is better for someone in my position to be familiar with a range of business functions, than to be a specialist in one or two.• My job requires me to be somewhat of a "jack-of-all-trades". |
| Personal Interests | <ul style="list-style-type: none">• Compared with my peers, I have a very broad range of outside interests.• My colleagues regard me as someone who is particularly knowledgeable about current affairs / a range of topics. |

Deep Exposure:

As above, respondents were asked to indicate the extent to which they had contact with specific types of people and issues inside and outside their company. Response options were from '1' (not at all) to '7' (to a very great extent).

- | | |
|------------|--|
| Functional | • My job involves the use of detailed information fairly specific to my role. |
| Depth | • My job is designed for someone who is a specialist in one or two business disciplines. |

Equivocality:

Respondents were asked about the nature of the situations they face in their job. Response options were, from left to right: 'to a very little extent'; 'to a little extent'; 'to some extent'; 'to a great extent'; and 'to a very great extent'.

- I am frequently surprised by information and situations I come across in my work.
- People at work are frequently unsure which are the "right" questions to ask to make sense of the situations and events we encounter.
- It is frequently unclear what an event means and how to respond to it.
- Information used in making decisions means different things to different people.

Company Support for Innovation:

Respondents were asked about the importance attached to new business ideas by their company, as well as the presence of formal systems and processes to enable innovation. Response options were from '1' (strongly disagree) to '7' (strongly agree).

- Generating new business ideas is a clear strategic priority for our business.
- There is a clear programme or system to encourage new business ideas.
- There is strong support for innovation in the top management team of my division.

APPENDIX 3-B

**PLOTS OF EXPERIENCE, EXPOSURE TO STIMULI, AND IDEA SET NOVELTY
AND VOLUME**

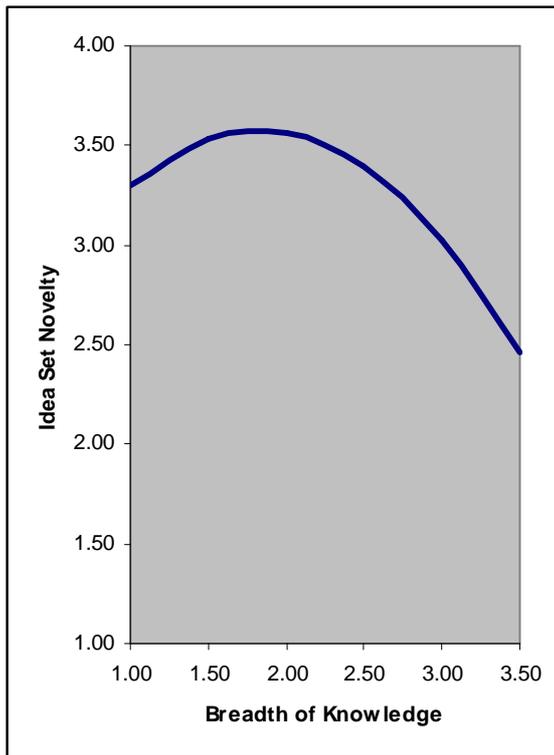


Fig 3-3a Breadth of Knowledge and Idea Set Novelty

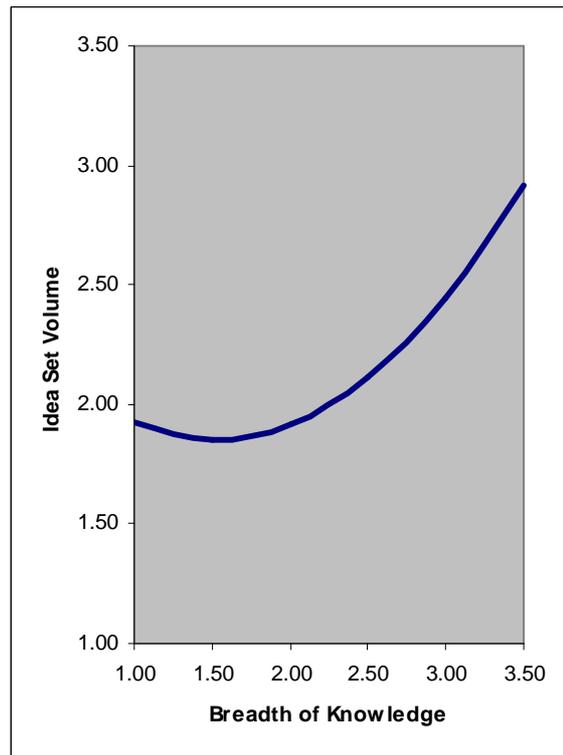


Fig 3-3b Breadth of Knowledge and Idea Set Volume

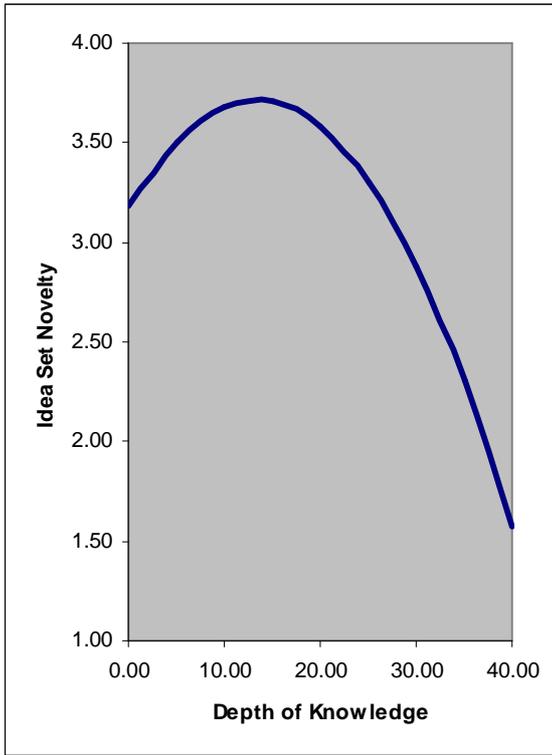


Fig 3-3c Depth of Knowledge and Idea Set Novelty

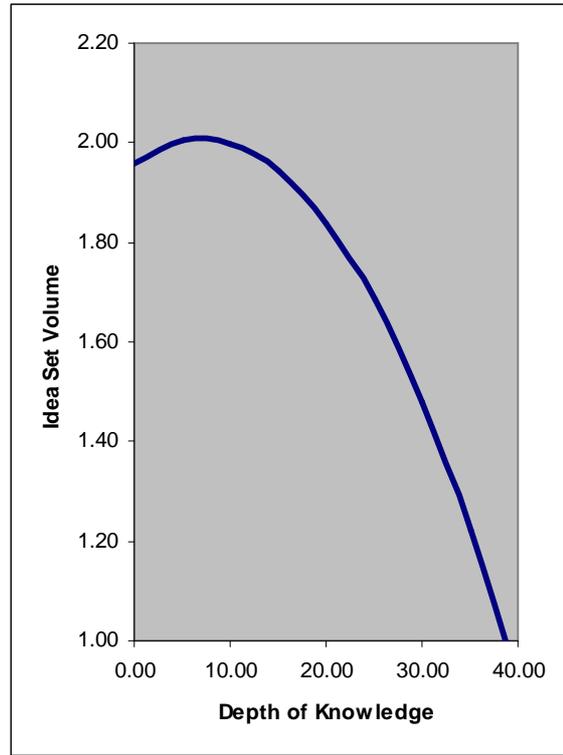


Fig 3-3d Depth of Knowledge and Idea Set Volume

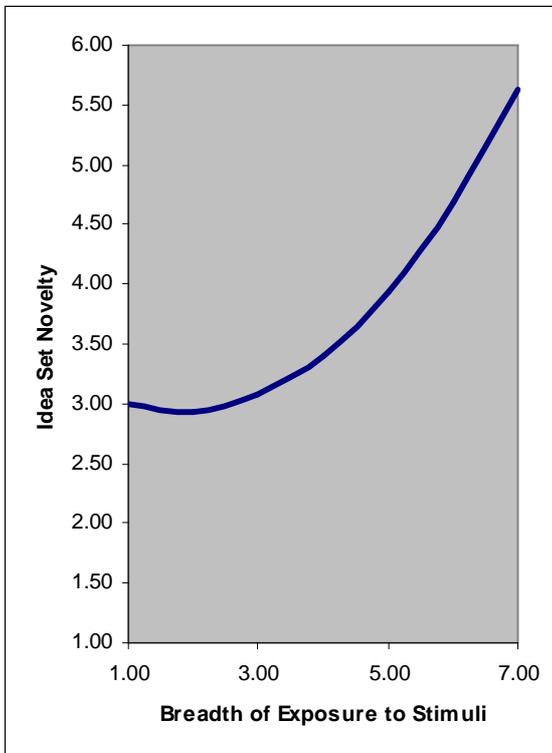


Fig 3-3e Breadth of Exposure and Idea Set Novelty

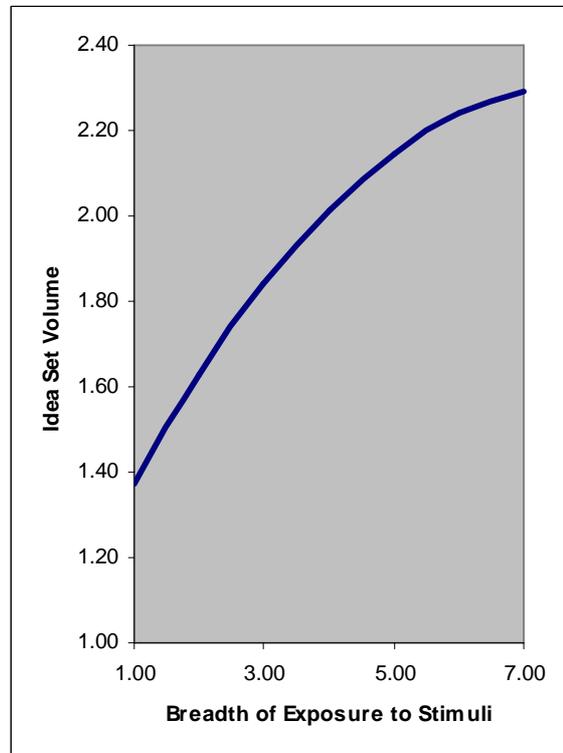


Fig 3-3f Breadth of Exposure and Idea Set Volume

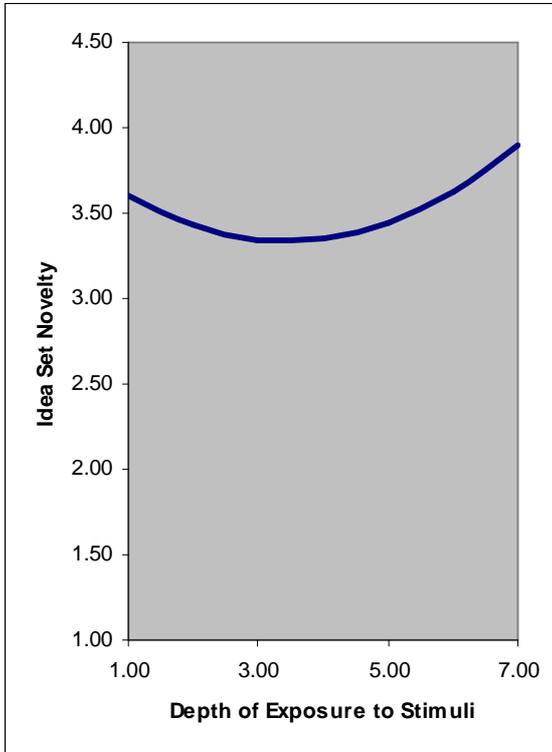


Fig 3-3g Depth of Exposure and Idea Set Novelty

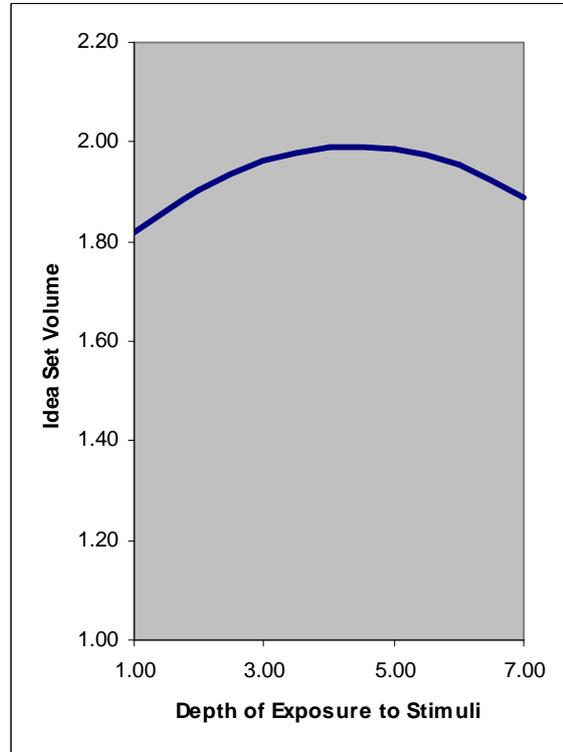


Fig 3-3h Depth of Exposure and Idea Set Volume

CHAPTER IV

STRATEGY-ORGANIZATION CONFIGURATIONS IN CORPORATE VENTURE UNITS: IMPACT ON PERFORMANCE AND SURVIVAL³⁷

4.1 Introduction

This chapter and the next address the neglected domain of corporate venture unit performance and survival. They draw on theories seldom, if at all, previously applied to this domain to build more nuanced and rigorous models of managerial and organizational factors impacting venture unit outcomes. Hence, they attempt to shed light on the research question posed for our second research domain, namely: *which processes, systems and structures are associated with superior (a) corporate venture unit performance, and (b) corporate venture unit survival?* Specifically, this chapter employs configurational theory and methods (Doty & Glick, 1984; Meyer et al., 1993; Miller, 1986, 1996) and March's (1991) distinction between the processes of exploration and exploitation, to investigate whether different types of corporate venture unit demonstrate differences in their performance and survival rates.

Corporate venturing has been a topic of scholarly and practitioner interest since the 1960s (Fast, 1981; Rind, 1981; von Hippel, 1977), although both actual corporate venturing practice and scholarly research efforts have been characterized by waves of heightened then waning interest (Birkinshaw et al., 2002; Chesbrough, 2000). A fairly common approach to conceptualizing corporate venturing has been to develop typologies or taxonomies in order to make sense of what appears to be a multitude of different objectives and activities undertaken by corporate venture (CV) units. This approach has recently been revitalized as interest has grown within large companies as to the wisdom and utility of adopting the structures and practices of

³⁷ An earlier version of this paper was published as: Hill, S.A. & Birkinshaw, J. 2008. Strategy-structure configurations in corporate venture units: Impact on performance and survival. *Journal of Business Venturing*, 23 (4): 423-444. We are grateful to Elsevier for their kind permission to reproduce this material here.

the limited partnership venture capital (VC) firm (Birkinshaw & Hill, 2003; Brody & Ehrlich, 1998; Chesbrough, 2000, 2002).

However, despite the progress that has been made in understanding corporate venturing, two major concerns remain regarding our understanding of CV unit types. First, we have a surprisingly poor understanding of the strategic objectives of corporate venture units, by which we mean the choices the unit makes about what activities it invests in and for what reasons. Existing typologies tend to focus on operational issues such as the degree of autonomy of the unit *vis à vis* the parent company, or whether venture investments are intermediated or not (Burgelman, 1984; Miles & Covin, 2002). By focusing on these types of organizational or operational matters, there is a risk that researchers are placing the ‘cart before the horse’ and encouraging structural choices to guide strategy.

Second, there is a surprising lack of systematic empirical evidence on the nature of CV units, which limits our ability to develop a solid foundation on which to build subsequent research. This is partly a data problem, by which we mean there is no definitive source of information on the objectives, structures, and activities of corporate venture units. There are good secondary sources of data on corporate venture capital (CVC) units, but these sources provide no information about internal organizational issues and they ignore internal corporate venturing (ICV) units that are typically more focused on internal opportunities. The problem is also partially an analytical one, in that it is extremely difficult to validate the optimum organizational choices that are associated with each different strategic objective a venture unit might take. Previous generations of researchers used contingency theory to examine the “fit” between one aspect of a unit’s internal organization and its externally-focused strategy (e.g. Galbraith, 1973; Lawrence & Lorsch, 1967). More recently, researchers have developed a configurational approach to evaluate the entire set of strategic and organizational choices made by a business unit (Doty & Glick, 1994; Meyer et al., 1993). Despite its complexities as an analytical approach, configurational analysis provides opportunities for important insights that cannot be gained by other methods through its focus on fit across multiple, interactive dimensions of strategy and structure (Miller, 1986, 1996).

This chapter attempts to overcome these two major deficiencies in prior research on corporate venture units. Building on the established traditions of the strategic management

literature (Chandler, 1962), we develop and test a typology of CV units that is based around the strategic objectives of those units. We frame our discussion of corporate venturing in terms of the fundamental tension that exists in firms between the need for exploration-oriented activities and exploitation-oriented activities (March, 1991), as well as in the choice between internal and external sources of opportunities (Miles & Covin, 2002; Sharma & Chrisman, 1999). We then examine organizational aspects of the venture unit, namely the network of relationships it builds with other parties, the activities it pursues and the internal systems it uses to support those activities, in relation to the initial strategic objectives chosen by the unit. Then, in order to test our typology, we adopt a configurational approach which, although very well suited to the complexity of the corporate venturing context, has not previously been employed in a systematic manner in the corporate venturing literature.

The study makes use of an original data set of 95 venture units (including both CVC and ICV units), incorporating interview and survey data collected over a three-year period. In the first section, we outline our proposal for a new CV unit typology based on the strategic objectives of the unit. We then derive a number of hypotheses regarding the identification of CV unit types, the configurations of elements that make up those types, and their implications for CV unit performance. Thereafter, we describe the methodology employed in the study, focusing on the use of a configurational approach to the statistical analysis. The final section describes the findings, and presents a discussion of the major issues arising from the study.

4.2 Background and Theoretical Development

While the term corporate venturing is used in a variety of ways in the literature³⁸, our focus in this chapter is the corporate venture unit, defined here as a distinct organization unit controlled by the parent firm that has responsibility for investing in business opportunities that are new to the corporation (cf. Block & MacMillan, 1993; Burgelman, 1984). Such units may engage in a variety of forms of investment, from making investments in independent start-ups, to incubating internal business ideas, to spinning out businesses.

³⁸ The term 'corporate venturing' is sometimes used in a broader sense than ours, to characterize a range of methods of creating new businesses, including alliances, acquisitions and venture capital investments (Keil, 2002, 2004).

4.2.1 Strategic Classification of Corporate Venture Units

In this section we identify two well-established constructs in the strategic management literature that, taken together, provide insight into fundamental distinctions amongst CV units in a manner that enables sharper discrimination between their strategic and organizational properties. Typically, corporate venturing typologies have focused on the practices and broad motivations of venture units (Burgelman, 1984; Chesbrough, 2002). We believe, in contrast, that the most useful typologies are the ones that are built on strategic objectives. For example, consider two well-known typologies in the field of strategic management: Porter's (1980) generic strategies (low cost, differentiation, focus) and Miles and Snow's (1978) strategy types (prospectors, defenders, analyzers), both of which represent the basic choices business units make in how they position themselves in their chosen markets. These choices help business units to make further choices about how they should organize themselves internally to deliver on their chosen objectives. And to the extent that appropriate structures and systems are put in place, superior performance should be achieved (Chandler, 1962; Lawrence & Lorsch, 1967). A recent study by Dushnitsky and Lenox (2006), which highlighted the importance of CVC strategic (versus financial) goals to enhancing value creation by firms, provides further empirical weight to the role strategic objectives play in corporate venturing.

The first dimension in our framework, the *locus of opportunity*, has a well-established tradition in corporate venturing literature (e.g. Miles & Covin, 2002; Sharma & Chrisman, 1999; Sykes, 1986). It refers to whether new venture ideas lie inside or outside the formal boundaries of the firm. Within an increasingly integrated, connected worldview, innovation is frequently conducted according to an 'open innovation' model whereby firms may "commercialize external (as well as internal) ideas by deploying outside, as well as in-house, pathways to the market" (Chesbrough, 2003: 36-37). This implies that some venture investments are likely to be made on the basis of ideas or opportunities found inside the firm, while others will be made on the basis of ideas or opportunities currently lying outside the firm's boundaries. The mix of internal and external venture ideas employed by a CV unit will, we assert, significantly impact the challenges and constraints faced by the unit and, accordingly, influence the form its relationships, activities and management systems take.

The second dimension, the *strategic logic* of the venture unit, identifies the relative importance of two different strategic agendas a CV unit may pursue: exploration or exploitation (March, 1991). Exploration (March, 1991: 85) involves “experimentation with new alternatives” with returns that are “uncertain, distant and often negative”, and is associated with the organization’s need for adaptability. Exploitation is the “refinement and extension of existing competencies, technologies and paradigms” with returns that are “positive, proximate, and predictable”, and is associated with the organization’s need for alignment. The distinction between exploration-oriented and exploitation-oriented activities is widely used across organizational literatures (Gupta et al., 2006). We propose that it is also potentially useful in the field of corporate venturing. Traditionally, most scholars have focused on the explorative role of CV units (e.g. Burgelman, 1984, 1985; Dushnitsky & Lenox, 2005, 2006; Galbraith, 1973, 1982; Wadhwa & Kotha, 2006)³⁹. However, we argue that CV units actually engage in both exploration and exploitation. For example, a venture unit may build on the firm’s existing assets to develop new technologies, or it may focus on leveraging existing technologies in order to yield financial returns. In such cases, there is a clear exploitation component to the venturing activity.

By integrating these two separate lines of thought, it is possible to identify four generic approaches to corporate venturing, as shown in Figure 4-1. We discuss these types in turn.

Internal explorer. The purpose of internal explorer units is to invest in new opportunities that arise inside the parent firm, and to actively nurture and grow them so that over time they become sources of growth for the firm. This is probably the most well-known form of corporate venturing, and it is comparable to Burgelman’s (1984, 1985) New Venture Division or the Internal Venturing models of Sykes (1986) and Miles and Covin (2002). The emphasis in such units is on exploration in the early years of development of a new opportunity.

An example is Shell’s GameChanger programme (Hamel, 1999). GameChanger was established in 1996 with the initial objective of spending 10% of Shell’s upstream technical budget on innovative, ‘venturing’ ideas. A stage-gate process was developed through which

³⁹ See Keil, Maula, Schildt, and Zahra (2008) and Schildt, Maula, and Keil (2005), for recent exceptions examining the impact of corporate venturing investment relatedness on exploratory and exploitative innovation.

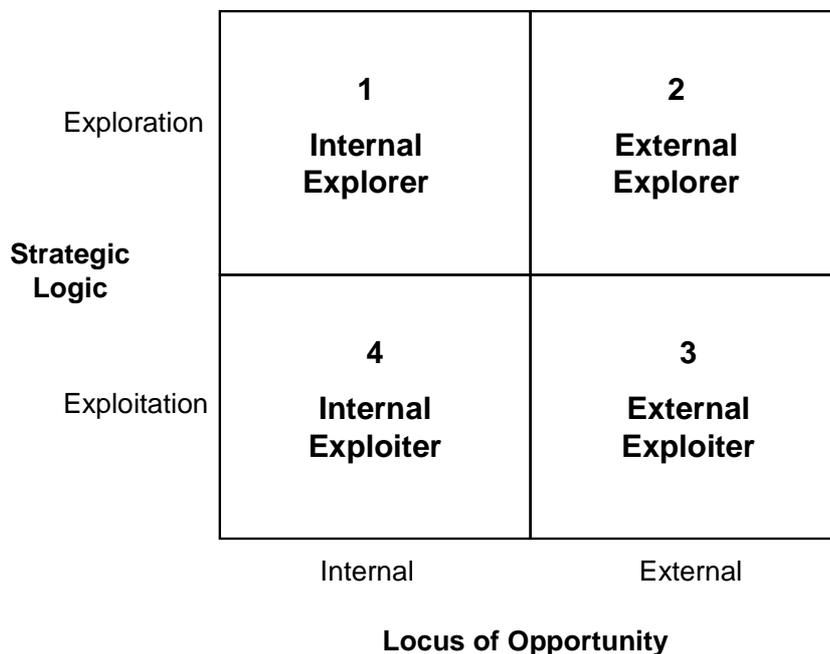


Figure 4-1 A Typology of Corporate Venture Units

Note: This framework can also be used more broadly to identify the generic forms of business development a firm can pursue. Q1 includes all forms of exploration where the locus of opportunity is internal to the firm, such as traditional R&D and internal knowledge sharing networks. Q2 represents exploration-oriented activities where the opportunity is outside the boundaries of the firm, including acquisitions, alliances and joint ventures. Q3 is concerned with exploitation-oriented activities where the locus of opportunity is outside the firm’s boundaries, such as bargaining with customers and/or suppliers to increase margins (Porter, 1980), and working with partner companies to develop complementary products. Q4 is concerned with exploitation of assets and opportunities internal to the firm, such as licensing of patents and technologies.

employees from anywhere within the Shell group could submit ideas for consideration, and could then, if successful, receive staged funding to develop and commercialize the venture. The process was subsequently adopted in a number of other areas within Shell. By mid-2002, GameChanger had screened 400 ideas, commercialized 32 new technologies, and established 3 new businesses.

Internal exploiter. The purpose of such units is to “generate cash from harvesting spare resources” (Campbell, Birkinshaw, Morrison, & Van Basten Batenburg, 2003: 35). They take existing assets within the firm, such as patents, technologies, raw ideas, and managerial talent, and they attempt to monetize these within a short time frame, frequently by spinning them out. Thus, while there is inevitably an element of exploration in such units, their dominant logic is one of exploiting existing assets and turning them into cash. While the logic of harvesting assets

through spin-offs has been recognized in the literature for many years (e.g. Burgelman, 1984, 1985), the creation of dedicated harvesting units only appears to have emerged during the most recent wave of corporate venturing activity (Chesbrough, 2000). Campbell et al. (2003) call these ‘venture harvesting’ units.

An example of an internal exploiter unit is British Telecom’s Brightstar unit, which was set up in 1999 to ‘uncover the hidden value’ in BT’s R&D database of 14 000 patents and 2 500 inventions. Within its first year of operating, 4 businesses had been launched and a further 11 funded; and by 2001 it had created revenues of £30 million (Campbell et al., 2003)⁴⁰.

External explorer. The purpose of external explorer units is to create value based on opportunities that lie beyond the current boundaries of the firm. In this model, the CV unit typically seeks to invest (alone or with other partners) in small firms and entrepreneurs. Critical to the selection of investments by these units is their estimated growth potential in a domain anticipated to be of future strategic importance to the firm – thus the common arguments from executives in such units that they need to create strategic options, or to generate a ‘window on new technology’ (Dushnitsky & Lenox, 2006). These units also seek to put into practice the emerging dictum that new value is created in the interstices between firms, rather than within traditional boundaries (e.g. Chesbrough, 2003; Powell et al., 1996).

An example of an external explorer unit is Siemens Venture Capital GmbH (SVC). It invests strategically in external companies and initiatives that are directly related to Siemens’ business activities, either as potential partners or suppliers. SVC typically takes minority equity stakes, in return for which it obtains a board seat. Often these investments lead to strategic relationships for Siemens, and occasionally Siemens ends up buying out the start-up company in question (Birkinshaw et al., 2002).

External exploiter. The purpose of external exploiter units is to make investments in external companies with a view to generating a financial return (what Chesbrough, 2002, terms ‘passive investments’). As with internal exploiter units, there is an element of exploration at work, but we would argue the logic behind the establishment of such units is primarily exploitive. Effort typically focuses on deal-making (buying and selling equity) rather than on

⁴⁰ In 2003, 60% of Brightstar was sold off to a UK private equity firm, Collier Capital.

nurturing and building the start-up business in question. Also, the reason firms create such units in the first place is typically because they believe they can leverage existing assets (e.g. knowledge of the industry, their brand name, their relationships) to capture investment opportunities that independent venture capitalists could not.

An external exploiter unit may, for example, leverage its parent's market power to make selective investments that strengthen its influence over other parties in the business system or to gain privileged access to specific deal flow (cf. Porter, 1980). It may also actively encourage the emergence of a variety of complementary products and services, to sustain or strengthen the business system that it derives value from. Examples of such units include GE Equity and Nokia Venture Partners.

4.2.2 Application of Configurational Theory to Corporate Venture Units

Having proposed a theoretically-grounded framework for categorizing CV units, the next step is to formalize and extend our logic through a set of testable research propositions. To do so we adopt a configurational approach, which involves specifying the organizational attributes we would expect to be associated with each type of venture unit, and then testing whether the level of 'fit' between the type of unit and its chosen organizational characteristics is associated with higher performance.

The configurational approach to organizational analysis has its roots in the work of Miller and Friesen (1984) and Mintzberg (1979, 1983) and became well established during the 1990s (Gresov & Drazin, 1997; Miller, 1996). It builds on certain of the principles of contingency theory, namely: that there is no one best way to organize; that different organizational arrangements are valid for different strategic conditions; and that "increased effectiveness is attributed to the internal consistency, or fit, among the patterns of relevant contextual, structural and strategic factors" (Doty et al., 1993: 1196). However, configuration theory extends, and indeed challenges, some of the limiting assumptions of contingency theory. Three differences are worth highlighting. First, configuration theory is concerned with multiple elements of strategy and organization, rather than the more limited set of concepts that are typically the focus of contingency theory. Second, configuration theory assumes that the relationships between elements of a configuration are reciprocal rather than unidirectional – attributes of the venture

unit's structure can influence its strategic objectives, as well as vice versa. Third, the notion of equifinality – that there is more than one way to succeed in each type of setting - is a central component of configuration theory.

A configurational approach implies the following model for CV units. The venture unit has a set of *strategic objectives*, defined in terms of the locus of opportunity it is pursuing, and its relative focus on exploration versus exploitation. It has an *organizational profile*, which consists of a number of aspects of its internal organization as specified below. And it achieves a certain level of *performance*, which we examine both in cross-section (i.e. at the time the strategic and organizational data was collected) and over time. The fundamental proposition under investigation is simply that the level of fit – that is, the congruence or internal consistency (Drazin & Van de Ven, 1985) - between a unit's strategic objectives and the elements of its organizational profile will be associated with higher performance (see Figure 4-2).

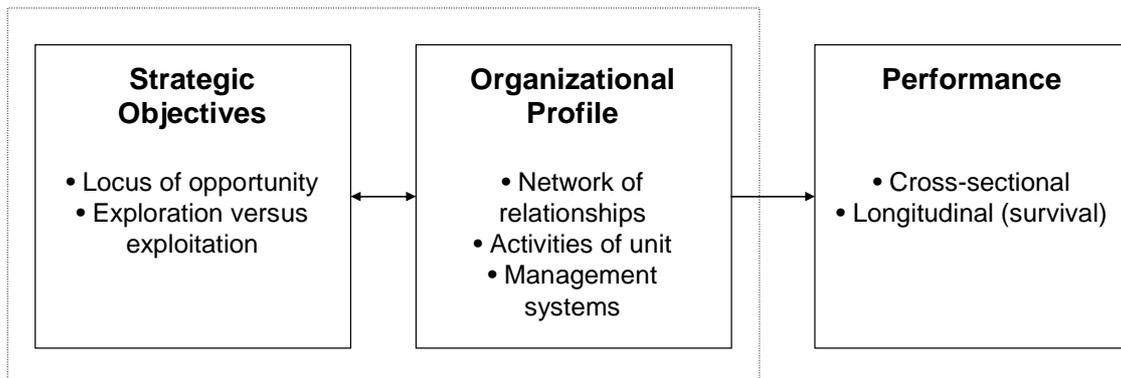


Figure 4-2 Configurational Framework for Corporate Venture Units

While well established in other areas of organization research, this logic has not, to the best of our knowledge, been applied to corporate venturing (Jennings & Hindle, 2004). Configurations logic, however, has demonstrated its utility in empirical tests examining the link between organizational contexts, structures and strategies, and performance outcomes (see Ketchen et al., 1997, for meta-analytic findings). Recent studies suggest, too, that this approach may aid understanding of corporate venturing performance. For example, Weber and Weber (2005), in a study of 20 German CVC organizations, found that those focused primarily on either strategic or financial goals – rather than on a mixture of both strategic and financial goals –

reported higher levels of goal attainment. Multiple goals created the potential for conflict and inefficiencies in CVC units. Extending this logic, fit with a strategic profile within our proposed typology may enable goal alignment and, accordingly, enhanced performance in CV units.

From a theoretical perspective too, configuration logic seems more suited to the complex context of CV types than does the bivariate logic of contingency analysis. By way of illustration, as we shall explore shortly, CV units have been shown to be embedded within complex webs of relationships, particularly with their parent companies but also increasingly with external parties such as venture capitalists and independent entrepreneurs. It appears unlikely that a simple set of organizational variables will differentiate one CV type from another.

What are the relevant elements of the CV unit's organizational profile? As no definitive list exists, we reviewed the corporate venturing literature to identify consistently recurring themes. One theme that dominates the literature is the embeddedness of CV units in complex webs of relationships – both with actors in their parent companies and also with external parties such as venture capital firms. Such relationships were recognized in early research (e.g. Galbraith, 1982; Kanter, 1985) and are now an increasingly important part of understanding how venture units gain access to the key resources they need to survive (e.g. Chesbrough, 2000; Maula et al., 2005). The network of relationships surrounding the CV unit can also be linked back to the established Bower-Burgelman process model (Burgelman, 1983, 1984, 1985) that examines the origins of strategic behavior within the structural and strategic contexts of large firms, and that has been extensively applied to the phenomenon of internal corporate venturing. Consequently, we identify this network of relationships as the central element of the CV unit's organizational profile.

The other relevant parts of the organizational profile are related to this network of relationships. Specifically, we examine the relative focus on different activities inside the CV unit, and the extent to which these are focused more on the needs of external or internal partners, and we examine the management systems used by the CV unit to support these various choices. More formally, the elements of the organizational profile are as follows:

- (1) The *network of relationships* held by the venture unit. This includes relationships with two key sets of stakeholders: (a) relationships with VC firms, for access to deal

flow and ideas (Brody & Ehrlich, 1998; Sahlman, 1990; Sykes, 1990), and (b) relationships with corporate executives in the parent firm, to diffuse the learning from the venture operations, and increase the potential for leveraging corporate resources into the venture unit (Burgelman, 1984; Galbraith, 1973, 1982; Siegel et al., 1988). It also includes (c) the operating autonomy of the CV unit *vis à vis* the parent company (Chesbrough, 2000, 2002; Fast, 1981; Galbraith, 1982; Kanter, 1985; Sykes, 1986, 1990), and (d) the extent to which the unit takes part in syndicated investments with members of the VC community (Brody & Ehrlich, 1998; Chesbrough, 2000, 2002; Sahlman, 1990; Zider, 1998).

- (2) The *activities* of the venture unit, by which we mean its level of involvement in the various developmental and managerial tasks that could potentially be performed by a venture unit. Research has identified a number of important activities: (a) selecting which ventures to invest in, (b) exiting ventures as necessary or appropriate, and (c) building and nurturing the ventures within the portfolio (Brody & Ehrlich, 1998; Chesbrough, 2000, 2002; Fast, 1979; Rind, 1981; Sahlman, 1990; Zider, 1998).
- (3) The *management systems* of venture units used to support the choices made above (Block & MacMillan, 1993; Fast, 1979, 1981; Rice et al., 2000). Specifically, we examine the management systems of venture units along two dimensions: (a) the types of measures used to evaluate the performance of the unit, and (b) the incentives provided for venture unit managers.

These organizational elements are expected to vary systematically across the four types of venture units. However, it would be inappropriate to develop formal hypotheses for each element in turn: the logic of configuration theory is that the elements interact with and reinforce one another to create a meaningful whole. Furthermore, the relationships between the elements are expected to vary from type to type, in a manner that uniquely supports performance for each distinctive CV unit type (Doty & Glick, 1994; Miller, 1996). Instead, we develop formal hypotheses that posit holistic relationships between venture units' strategic profiles, organizational profiles, and performance.

4.2.3 Hypotheses

Consider first the relationship between the CV unit's strategic objectives and its organizational profile. Configuration theory suggests that there should be alignment between the two, so that internal exploiter units typically adopt one organizational profile, internal explorer units adopt another, and so on.

Why wouldn't we expect to find strategic objectives and organizational profiles randomly distributed across CV units? The predictive power of configurations lies in the fact that relatively few alignments are likely to occur (Miller, 1986, 1996). In the words of Miller (1986: 235-236), "elements of strategy, structure and environment often coalesce or configure into *a manageable number of common, predictively useful types* that describe a large proportion of high-performing organizations" (emphasis added). A number of factors, or imperatives (Miller, 1986, 1987), in combination, drive the formation and persistence of these small sets of common configurations of elements. Darwinian selection mechanisms weed out poorly performing organizational forms, and emerging forms are imitated by others through both mimetic and normative isomorphic processes (DiMaggio & Powell, 1983). Managerial selection mechanisms also constrain the range of organizational forms occurring in practice (Drazin & Van de Ven, 1985). The greater the strength of these selection regimes, the more restricted the range of organizational forms one can expect to find (Drazin & Van de Ven, 1985). Strategy and structure, too, serve as mutually constraining influences: "given a particular strategy there are only a limited number of suitable structures and vice versa" (Miller, 1986: 234). Once established, these configurations tend to adhere relatively unchanged for substantial periods.

Applying these arguments to the CV context, we would expect learning over the years (Chesbrough, 2002) to have resulted in a limited number of CV forms being widely reproduced. We would also expect mutually constraining impacts of organizational elements (relationships with parent companies and venture companies, parent company management systems and human resource practices, etc.) and strategic elements (the elements of strategic logic and locus of opportunity) to have narrowed the range of viable CV unit configurations to those that demonstrate congruence (Drazin & Van de Ven, 1985). We thus expect to find the four CV unit types matched to their own unique organizational profiles, i.e. to unique configurations of relationships, activities and management systems.

Hypothesis 1: *Each of the CV unit types, as defined by its strategic profile, will be associated with a unique “organizational profile”.*

The second hypothesis is concerned with venture unit performance. Configuration theory suggests that each ideal type represents a “tight constellation of mutually supportive elements” (Miller, 1986: 236) that act synergistically to enhance performance. Put another way, each type embodies an internally consistent pattern of relationships among its constellation of elements; the pattern of relationships between elements is not expected to be the same across all types as each will embody its own form of internally consistent relationships among its elements (Doty & Glick, 1994; Drazin & Van de Ven, 1985). Thus, the more closely an organizational unit resembles the elements of an ideal type configuration, the more likely it will experience synergies that aid its performance.

In the case of our typology, close alignment between the elements of the venture unit’s organizational profile and the associated set of strategic objectives is anticipated to result in higher performance. Along with synergies generated from compatible strategies and structures, CV units that have aligned strategies and structures are likely to experience tangible benefits in their day-to-day working, such as greater clarity of direction and greater ease of coordination amongst staff (Miller, 1996).

This may appear to be an obvious hypothesis, but it is subtly (and importantly) different from a traditional classificatory typology logic, because it emphasises the proximity of the unit to its “ideal”, rather than to its membership of one category of venture unit or another. As observed by Doty et al. (1993: 1198), “when the configurations are treated as categories, marginal members of the categories are predicted to be as effective as their central members. When the configurations are treated as ideal types, organizations that marginally resemble the types are predicted to be much less effective than organizations that closely resemble them.” Accordingly:

Hypothesis 2: *The greater a CV unit’s level of fit to its ideal type, the greater the unit’s cross-sectional performance.*

As well as looking at the cross-sectional performance of venture units, we also consider a dynamic view of performance, or more specifically the likelihood that the corporate venture unit will survive for a period of two years. This time period is chosen on the basis of prior research

on corporate venturing (Fast, 1979, 1981; Gompers & Lerner, 2001; Rind, 1981) which suggests that the normal life expectancy of a venture unit is between 2 and 6 years. While we by no means suggest that survival should be taken as an exclusive or entirely definitive indicator of corporate venturing 'success' (refer to McGrath, 1999, for a discussion of how 'failed ventures' can result in learning), survival is an important consideration for two reasons. First, it is clearly a necessary condition for long-term success, and given the high mortality rates in the world of corporate venturing it is not a trivial matter for a unit to survive this long. Second, it provides a barometer for the broad alignment of the unit with the strategic goals of the parent company, rather than simply the internal alignment of the various elements of strategy and organization.

Extant literature provides little guidance on the dynamic performance of the CV unit types. Most literature on the survival of CV units focuses rather on the extreme risks to these units of closure based on factors outside their control, such as economic downturns, a worsening of company fortunes and changes in the political will towards a venture unit (Fast, 1979, 1981; Burgelman & Valikangas, 2005). We propose two alternative hypotheses – each of which makes somewhat different assumptions about the relationship between venture unit survival and venture unit performance.

First, consistent with configurational logic, we predict that those units with strategic objectives and organizational profiles close to those of the ideal type configurations will have greater longevity than those with mis-fitting profiles. Where parent companies premise decisions regarding venture unit continuance or closure primarily on the units' performance record, those units with greater fit to an ideal type are more likely to experience high performance (Miller & Friesen, 1984; Ketchen et al., 1993) and, accordingly, to experience higher survival rates.

Second, following a contingency logic, we might expect to see significant differences in survival rates across the different venture unit types. More specifically, we build on the argument that exploitation-oriented activities tend to drive out exploration-oriented activities (Levinthal & March, 1993; March, 1991), both because exploration-oriented activities are more uncertain in their outputs, and because they operate on a longer time horizon than exploitation-oriented activities. Accordingly, the performance of exploration-oriented units may be more

difficult to assess objectively in the short-term, while exploitation-oriented units may be more able to 'work to plan' (Fast, 1979, 1981) and to deliver measurable short-term outputs.

In the specific context of CV units, the implication is that internal explorer and external explorer units may be inherently fragile: they typically have a harder time building credibility for their activities, and turning their investments into positive cash-flow activities than do internal exploiter and external exploiter units. For internal exploiter units, the immediate objective is to turn assets into cash, so they typically offer a fast return on investment; while for external exploiter units, there is often additional security and legitimacy provided by the existence of outside investors. Thus we develop the following alternative hypotheses:

***Hypothesis 3a:** CV unit survival (longitudinal performance) is associated with the fit of the venture unit to its ideal type.*

***Hypothesis 3b:** CV unit survival (longitudinal performance) is associated with membership of an exploitation-oriented (rather than exploration-oriented) type.*

Although these hypotheses are posed as alternatives, it is also conceivable that both effects might be at play simultaneously i.e. exploitation-oriented units that evidence high fit with their ideal types may experience the lowest rates of closure.

4.3 Methodology

4.3.1 Research Design

The research consisted of three phases. The first phase, in mid-2001, comprised exploratory interviews with 50 individuals in 40 CV units across eight countries. These interviews were used to better understand current corporate venturing practices, activities, and objectives, and factors perceived to influence corporate venturing success.

The second phase, in late-2001, was a survey of CV unit managers. The analysis that follows in the chapter derives primarily from the responses to this questionnaire. The sampling frame consisted of CV units listed in the Corporate Venturing Directory and Yearbook 2001. A number of additional venture units with which the researchers were familiar were also included in the sampling frame. Together these sources yielded 447 potential respondents to whom mail

surveys were distributed⁴¹. The most senior manager (or operational ‘head’) of each of these 447 CV units was the subject of our communication. Follow-up calls and further investigation found 120 CV units to be inactive, resulting in a potential pool of 327 CV unit respondents. Responses were received from the heads⁴² of 95 units (for full details of the sample refer to Birkinshaw, Van Basten Batenburg and Murray, 2002): an eventual response rate of 29% from the pool of 327 active CV units. Subjective perceptions of unit performance garnered from the questionnaire were also supplemented with Venture Economics data⁴³ on CV unit investment history, where such data was available (for 71 CV units). This secondary data validated survey responses on the investment history of the venture units⁴⁴.

This final sample represented a broad cross-section of industries. A large number of responding CV units (48 percent) were from high-technology sectors, such as telecommunications, biotechnology, pharmaceuticals, electronics and IT⁴⁵. The remainder (52 percent) were from a variety of sectors, including oil and gas, automotive, manufacturing, consumer goods, transport and professional service sectors. The bulk of respondents were from Europe (48 CV units) and North America (44 CV units); the remaining three units were from SE

⁴¹ It is possible that this sampling frame resulted in the sample being somewhat skewed towards externally oriented units given that such units may be keener to advertise their presence (through inclusion in the Yearbook) to external entrepreneurs and private equity investors. We tried to counteract this bias by incorporating all other CV units known to the researchers (who went to extensive efforts to learn of additional units) into the sampling frame. These efforts included asking the 50 individuals we interviewed to tell us about other companies engaged in corporate venturing; working with executives at the industry associations to identify CV units; attending a number of prominent corporate venturing conferences to further our search for additional units; and conducting an extensive web-based search. Beyond these efforts, however, it becomes difficult to obtain a comprehensive sampling frame given that there are no legal requirements for public companies to report the existence of a venturing unit where this is not established as a separate legal entity. We return to this point later in discussing the limitations of the study.

⁴² The most frequently occurring job titles of responding CV unit heads were ‘Managing Director’ (20 respondents), ‘Director’ (12 respondents), ‘Vice President’ (20 respondents) and ‘President’ (8 respondents).

⁴³ As financial returns or other reasonably ‘objective’ measures of corporate venturing unit performance are notoriously hard to come by, the Venture Economics database has been used extensively for research on private equity (Dushnitsky & Lenox, 2005, 2006; Gompers & Lerner, 1998; Maula, 2001, 2007; Wadhwa & Kotha, 2006).

⁴⁴ Our self-reported (survey) portfolio data was highly consistent with Venture Economics data, thus providing us with a fair degree of comfort in the accuracy of the self-reported performance measures. Specifically, both the number of venture unit investments reported by respondents and the proportion of the portfolio experiencing liquidity events reported highly significant correlations ($p = .000$).

⁴⁵ The industry representation of respondent parent companies was as follows (in order of frequency): electronics and computing (13 companies); professional services (financial, insurance, consulting, media) (13 companies); biotechnology, medical and pharmaceutical (11 companies); oil, gas, energy and chemicals (11 companies); telecommunication access provision (11 companies); telecommunication networks (11 companies); industrial manufacturing and automotive (8 companies); retail and consumer goods and services (6 companies); and transport (1 company). Ten companies were classified as ‘diversified’.

Asia. The CV units also displayed a variety of governance, financing and reporting arrangements. In terms of governance structures, 85 of the CV units sampled were 100 percent owned by their parent corporations. In the remaining instances, parent corporations either owned a majority stake (five units), or a minority stake (five units), with the venture unit financed and structured as a closed fund with outside investors. Regarding the financing arrangements of the CV units, the sample was fairly evenly split between units funded via a closed fund established solely by the parent company (29 units), a 'separate pot of money' coming directly from the parent company's revenues (27 units), and via an investment-by-investment process of internal review (33 units). A minority of CV units received financing via a fund with outside investors. In terms of reporting relationships, almost half (44) of the CV units sampled reported to the highest level of their parent company (i.e. to its CEO or top management board). A variety of other reporting relations were also evidenced in the sample, with CV units reporting to: the CFO, an advisory board, the strategy director, the head of R&D, and to existing business units.

Respondents and non-respondents were compared along a number of indices for which comparative data was available for the two groups. ANOVAs and cross-tabs, conducted to test for systematic differences between respondent and non-respondent CV units, did not find any significant differences along age of unit, monetary budget allocated to unit, average annual number of investments made by unit, number of employees per unit, or unit preference for 17 types of funding (e.g. start-up funding, first stage funding, second stage funding, and so on). Significant differences were only found for the headquarter location of CV units and their relative preference for seed funding. Specifically, the proportion of European respondents was somewhat higher than expected, whilst fewer than expected responses were received from North American CV units ($\chi^2 = 39.56, p = .000$); the proportion of respondents expressing a preference for seed funding was higher than amongst non-respondents ($\chi^2 = 6.70, p = .010$). Overall, these analyses suggest that respondents were not substantively different from non-responding units in our sampling frame.

The third phase took place in late 2003. Follow-up phone calls were made to the managers of all the CV units that had participated in the mail survey. Respondents were asked whether the corporate venture unit for which they had completed the questionnaire was still active. If the CV unit was no longer active, respondents were asked to recall the month and year

in which the unit ceased operations. Of the 95 CV units in the original questionnaire sample, we were able to speak with a person from 81 of the units (85% of the sample). For the remainder, archival and web searches were used to ascertain the status of the unit. Of the original sample, 22 CV units (23%) were found to have closed down subsequent to the survey, while the remaining 73 (77%) were still active. As this data on CV unit survival was collected two years after all other data, the responses we received were unlikely to be influenced by the earlier round of data collection, thereby countering the threat of common method bias to the relationships between our independent and dependent variables.

4.3.2 Development of the Fit Measures

We apply the analytical method developed by Doty et al. (1993) in which the observed profiles (across all elements) of venture units are compared to the 'ideal' profiles as assessed by expert raters. We asked five academics with extensive knowledge of the field of corporate venturing to rate the four ideal types according to each of the elements of the strategic objectives and organizational profile described above. Thus, for example, they were asked to rate the level of autonomy that should ideally be given to an internal exploiter unit, to an external explorer unit, and so on. Table 4-1 lists the average ratings of the experts for all the elements of the ideal types. The table also lists the standard deviation of the five expert ratings for each element (a measure of inter-rater reliability), which ranged between 0.42 and 0.85 on a five-point scale.

Variables	Scale Reliabilities	IET	EER	IER	EET	Inter-rater Reliabilities ¹
Strategic Profile						
1. Focus on internal ideas, 1-7 scale	Single item	7.00	3.00	6.00	2.00	0.68
2. Focus on external ideas, 1-7 scale	Formative, 2-item scale	2.00	6.00	3.00	7.00	0.85
3. Importance of organic growth, 1-5 scale	Single item	1.00	5.00	5.00	1.00	0.58
4. Importance of spin-outs, 1-5 scale	Single item	5.00	1.00	1.00	3.00	0.75
5. Importance of learning from start-ups, 1-5 scale	Single item	1.50	5.00	3.00	2.00	0.86
6. Importance of financial gain from start-ups 1-5 scale	Single item	2.50	2.50	1.00	5.00	0.42
Organizational Profile						
7. Relationships with VCs, 1-5 scale	.82	4.00	3.50	2.50	5.00	0.63
8. Relationships with corporate executives, 1-5 scale	.77	3.50	4.00	5.00	2.00	0.55
9. Autonomy of unit, 1-3 scale	.92	2.50	2.00	1.50	2.70	0.51
10. Syndication of investments, 1-4 scale	.74	2.80	2.80	1.50	3.60	0.59
11. Selecting and exiting ventures, 1-5 scale	.77	4.50	3.50	4.00	3.50	0.61
12. Building ventures, 1-5 scale	.90	4.00	3.00	5.00	2.00	0.80
13. Focus on measures of financial performance, 1-7 scale	.75	6.00	4.50	4.50	6.00	0.43
14. Use of equity-based compensation for executives, 1-5 scale	.61	2.50	2.50	1.25	4.00	0.61

Table 4-1 Reliabilities and Rater Estimates of Corporate Venture Unit Ideal Types

Note:

IET = Internal Exploiter unit, EER = External Explorer unit, IER = Internal Explorer unit, EET = External Exploiter unit.

¹ Inter-rater reliabilities are the standard deviation of the ratings by the 5 expert raters, averaged across the 4 venture unit types.

To create the measure of ‘fit’, we calculated the Euclidean distance from the venture unit to each different venture unit type (Doty et al., 1993), using the following formula:

$$D_{io} = \sqrt{(X_i - X_o)W(X_i - X_o)'}$$

where

D_{io} = the distance between ideal type i and organization o ,

X_i = a $1 \times j$ vector that represents the value of ideal type i on attribute j ,

X_o = a $1 \times j$ vector that represents the value of organization o on attribute j .

and

W = a $j \times j$ diagonal matrix that represents the theoretical importance of attribute j to ideal type i .

A critical part of this measure is the weighting applied to each element. In the absence of any strong logic to the contrary, we gave equal weighting to each of the three parts of the organizational profile (namely, networks of relationships, activities, and management systems).

Once distance measures had been created between each unit and all four ‘ideal’ venture unit types, we allocated the unit to the venture type it was closest to. This was done in two ways, according to: (a) the ‘strategic profile’ of the venture unit, and (b) the ‘organizational profile’ of the venture unit. ‘Fit’ measures were then obtained for each CV unit along these two profiles by reversing the applicable distance score (as per Doty et al., 1993).

4.3.3 Operationalization of Variables

Strategic profile. We developed questions relating to the two dimensions of the framework. Three questions concerned the locus of opportunity. Specifically, respondents were asked to rate the importance of various sources of new ideas and business proposals: (1) employees inside the corporation; (2) venture capitalists; (3) others, directly from outside the corporation (on a 5-point scale where 1 = ‘not at all important’, and 5 = ‘extremely important’). The first of these represented *internal locus of opportunity*, the second and third represented (formative indicators of) *external locus of opportunity*.

Four questions were concerned with the dimension of exploration versus exploitation. These questions were used individually in the development of the ideal type profiles. Specifically, respondents were asked to rate the extent to which the venture unit invested in new business ideas to: (1) promote organic growth; (2) learn from them and develop strategic relationships; (3) spin them out as separate businesses; and (4) generate financial returns (where 1 = ‘never’, 2 = ‘only in exceptional cases’, 3 = ‘occasionally’, 4 = ‘frequently’, and 5 = ‘almost always’). The former two indicated a relative emphasis on *exploration*, the latter two indicated a relative emphasis on *exploitation*.

Organizational Profile. Multiple measures were used to capture the three dimensions of CV units’ organizational profiles, namely: (1) their networks of relationships, (2) the activities they engage in, and (3) their management systems. The following four measures relate to CV units’ *networks of relationships*:

Contact with venture capitalists: Respondents were asked how frequently they communicated with: (1) partner VC companies; (2) other companies or individuals in the VC community; and (3) CV units in other companies. The response format was as follows: 1 =

‘daily’, 2 = ‘weekly’, 3 = ‘monthly’, 4 = ‘rarely’, 5 = ‘never’, and ‘not applicable’. The measure constituted the mean score per unit on the three items (Cronbach’s alpha = .82).

Contact with corporate executives: Respondents were asked how frequently they communicated with: (1) senior executives in the corporate parent they reported directly to; (2) other senior executives in the corporate parent/head office; (3) technical/R&D people in the corporate business units/divisions; and (4) front line/middle management in corporate business units/divisions. The response format was as follows: 1 = ‘daily’, 2 = ‘weekly’, 3 = ‘monthly’, 4 = ‘rarely’, 5 = ‘never’, and ‘not applicable’. The measure constituted the mean score per unit on the four items (Cronbach’s alpha = .77).

Autonomy: Respondents were asked to indicate who made decisions regarding the investment activities of the CV unit, selecting (a) “decision made exclusively by venture unit managers”, (b) “decision made with ratification by or consultation with corporate board/executives”, or (c) “decision made primarily by corporate board/executives” for each of 7 listed activities. The activities were: (1) seed investment in a new business idea (<\$100,000); (2) investment of \$100,000 to \$1 million in a new business; (3) investment of \$1 million to \$5 million in a new business; (4) investment of more than \$5 million in a new business idea; (5) trade sale of a venture business; (6) closure/termination of a venture business; and (7) decisions to pursue an IPO for a venture business. The mean of responses to the 7 items (reverse-scored) constituted the measure (Cronbach’s alpha = .92).

Deal syndication: The extent to which a venture unit engaged in deal syndication with VCs was examined through two questions asking (a) the percentage of equity held by the unit in a ‘typical’ investment project (‘100%’, ‘majority stake’, ‘minority stake’, or ‘small stake <15%’), and (b) the number of other equity partners (including VCs and other companies) in a typical investment project (‘>2’, ‘2’, ‘1’, or ‘0’) (reverse scored). The mean of responses to the 2 items constituted the measure (Cronbach’s alpha = .74).

Two measures examined *venture unit activities*. To assess the relative focus on different activities in the venture unit, we developed a set of questions asking about two specific areas: (1) building and developing the ventures in the unit, and (2) selecting and exiting from existing ventures and investments. Respondents were asked to indicate the extent to which they

undertook each activity on a scale of 1-5 (where 1 = 'never', 2 = 'only in exceptional cases', 3 = 'occasionally', 4 = 'frequently', 5 = 'almost always'). Exact wording of the items was as follows: (a) identifying/seeking out business ideas in which to invest, (b) assessing and selecting which ideas to invest in and which not to, (c) helping to negotiate the exit strategy for portfolio companies, (d) networking with other parts of the corporation to develop support and awareness of our ventures [together forming *selecting and exiting ventures*, Cronbach's alpha= .77]; and (e) working with individuals to develop their ideas, (f) working with individuals to develop and commercialise their plans, and turn them into viable businesses [together forming *building ventures*, Cronbach's alpha= .90].

Two measures examined the *management systems* of the venture units:

Use of financial measures: This variable indicated the extent to which venture unit performance was measured using financial indicators typically associated with VC operations. Respondents were asked to what extent they used the following measures of performance: (1) internal rate of return (IRR), and (2) financial gain of portfolio companies. Responses were scored along a 5-point scale, anchored on the left-hand side by 1 ('not at all') and on the right by 5 ('to a great extent') (Cronbach's alpha = .75).

Use of equity-based compensation: This measure captured the extent to which a CV unit compensated its managers through variable pay related to the shareholder value of the unit's investment portfolio. Specifically, CV unit managers were asked to what extent they used the following: (1) carried interest in portfolio businesses; (2) equity and/or options in portfolio companies; and (3) a straight corporate salary (reverse-scored). The response format was as follows: 1 = 'never', 2 = 'only in exceptional cases', 3 = 'occasionally', 4 = 'frequently', and 5 = 'almost always' (Cronbach's alpha = .61).

Venture unit performance. Respondents were asked to assess the performance of the venture unit on multiple dimensions. We then factor-analysed the responses to develop three measures of performance, each concerned a distinctive facet of the contribution a venture unit may make to its parent company. The three measures pertain to: (a) financial performance, i.e. the extent to which the venture unit delivered against financial goals; (b) technological awareness, i.e. the extent to which the venture unit developed new and valuable technologies for

the parent company; and (c) entrepreneurial capability, i.e. the extent to which the venture unit enhanced the entrepreneurial capability of the parent company.

The use of multiple measures of performance is important given the diverse objectives associated with corporate venturing (Chesbrough, 2002). Specific measures were as follows:

Financial performance: Managers were asked to rate the financial performance of their unit against expectations⁴⁶ over the past three years (or its period of operation, if shorter) on three key financial objectives identified within the exploratory interviews, namely: (1) financial return to the corporation (e.g. IRR); (2) contribution to top-line growth; and (3) increased valuation of corporate stock. Response options along a 5-point scale were anchored by 1 = 'below expectation', 3 = 'equal to expectation', and 5 = 'above expectation' (Cronbach's alpha = .72).

Technological performance: Along the format described above, this scale constituted the mean response of CV unit managers to the following items: (1) creation of breakthrough technology for the corporation; (2) investment in disruptive technologies that potentially cannibalize existing technologies; and (3) development of strategic relationships with external suppliers/customers/competitors (Cronbach's alpha = .74).

Entrepreneurial performance: As per the above two measures, CV unit managers were asked how well their venture unit had delivered on a set of objectives. The scale constitutes the mean value of responses to the following items: (1) creation of stronger entrepreneurial culture; (2) attraction of talented new employees; and (3) retention and motivation of employees (Cronbach's alpha = .75).

Survival status. This categorical measure – from the follow-up telephone calls in 2003 to the CV units that participated in the survey – recorded whether the unit was active or inactive.

Control variables. Three control variables were used in the analyses: age of the venture unit (in years), number of full-time employees in the unit, and a dummy variable ('region') indicating whether or not the venture unit was headquartered in the United States.

⁴⁶ By measuring performance against expectations, rather than against absolute levels of performance, we take into account that different units (and venture unit types) may be expected to achieve differing levels of performance along different dimensions.

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Dependent Variables																					
1. Financial performance	3.06	.61																			
2. Technological performance	3.16	.62	.37**																		
3. Entrepreneurial performance	3.19	.53	.10	.16																	
4. Survival status	-	-	.18	.21	.12																
Fit Variables																					
5. Fit with nearest strategic profile ideal type	-7.41	1.93	.14	.13	-.10	-.03															
6. Fit with nearest organizational profile ideal type	-11.16	2.97	.28**	.37**	.32**	.14	.17														
Independent Variables																					
<i>Strategic Profile Variables</i>																					
7. Focus on internal ideas	4.75	1.77	-.07	-.14	.04	.04	-.18	-.10													
8. Focus on external ideas	5.01	1.19	.00	.05	-.12	.16	-.29**	-.24*	-.23*												
9. Importance of organic growth	2.11	1.27	.02	.19	.09	-.21*	.31**	.09	.26*	-.24*											
10. Importance of spin-outs	2.26	1.09	.19	.16	.22	.06	.11	.20	.23*	-.28**	.39**										
11. Importance of learning from start-ups	3.61	1.43	-.03	.02	-.16	.08	-.39**	-.29**	-.06	.39**	-.27**	-.12									
12. Importance of financial gain from start-ups	2.28	1.59	.12	.065	.02	.08	.04	.09	-.26*	.21*	-.34**	-.24*	-.19								
<i>Organizational Profile Variables</i>																					
13. Autonomy of unit	2.00	.55	.28*	.10	.179	.26*	-.06	.38**	-.13	.15	-.41**	-.06	.10	.23*							
14. Syndication of investments	3.17	.83	.07	.03	-.23*	.15	-.26*	-.38**	-.26*	.39**	-.45**	-.32**	.44**	.20	.10						
15. Selecting and exiting ventures	4.34	.69	.14	.21	-.00	.14	-.09	.02	-.21*	.31**	-.18	-.06	.17	.25*	.17	.25					
16. Building ventures	2.86	1.16	.06	.05	.16	-.10	.06	.24*	.34**	-.23*	.35**	.41**	-.21*	-.10	-.22*	-.48**	.16				
17. Relationships with VCs	3.28	.86	.17	.26*	.07	.25*	-.10	-.10	-.22*	.36**	-.31**	-.26*	.28**	.27**	.08	.41**	.37**	-.17			
18. Relationships with corporate executives	3.43	.77	-.01	.16	.05	.20*	-.03	.12	.02	.02	.03	-.02	.18	-.06	-.03	.08	.12	-.02	-.02*		
19. Focus on measures of financial performance	5.32	1.71	.27*	.20	.24*	.10	-.10	.33**	-.05	.15	-.13	.15	.067	.28**	.32**	.00	.30**	.08	.18	.15	
20. Use of equity-based compensation for executives	1.97	1.06	.09	.12	.16	.10	-.11	.18	-.07	.10	-.21*	.01	-.02	.35**	.38**	.04	.31**	.04	.06	-.13	.35**

Table 4-2 Correlation Matrix (Whole Sample)

Note: Two-tailed Pearson correlation coefficients are reported. * $p < .05$ ** $p < .01$

4.4 Findings

Means, standard deviations, and correlations among the variables are shown in Table 4-2.

Hypothesis 1 was concerned with the alignment between the organizational and strategic profiles of the CV units. Following Doty et al. (1993), we tested this hypothesis via a maximum likelihood log linear analysis (using a Poisson distribution). This test (*likelihood ratio* = 28.67, *p* = .001) confirmed that, in line with our expectations, the strategic and organizational profile dimensions are not independent of each other. In other words, the CV units that most closely approximate the internal exploiter strategic profile tend also to most closely approximate the internal exploiter organizational profile, and so on for the other three ideal types.

Table 4-3 displays the contingency table showing the frequency with which the CV units in the sample were associated with the four strategic and organizational profiles. It is evident that there is a moderate level of convergence between the organizational and strategic profiles of the venture units. For example, of the 30 venture units that are most closely rated to the external explorer strategic profile type, 20 have organizational configurations that are congruent with the external explorer organizational profile, according to ideal type ratings. In total, 40% of the CV units have aligned strategic and organizational profiles, which is perhaps rather less than we would have anticipated, a point we return to in the Discussion section. The convergence between strategic and organizational profiles is strongest for those units resembling our exploration types (i.e. the internal explorer and external explorer types).

		Organizational Profile				Total
		IET	EER	IER	EET	
Strategic Profile	IET	4	4	0	0	8
	EER	5	20	0	5	30
	IER	4	15	7	2	28
	EET	9	6	0	3	18
Total		22	45	7	10	84

Table 4-3 Frequency Distribution of Corporate Venture Units by Strategic and Organizational Profiles

Note: IET = Internal Exploiter unit, EER = External Explorer unit, IER = Internal Explorer unit, EET = External Exploiter unit.

We conducted supplementary post-hoc analysis to investigate where the actual differences in organizational elements between the unit types lay. Accordingly we ran ANCOVA analyses (controlling for the age of the venture unit and the number of venture unit staff; refer to Table 4-4) to assess whether the unit types displayed significant differences along individual elements of the organizational profile. While this does not provide a test of Hypothesis 1 – which is posited at the level of the configurational profile (i.e. a holistic combination of individual organizational elements) rather than that of individual organizational attributes - these tests do indeed demonstrate significant differences between the types on six of the eight organizational variables. Thus, the types appear to differ in both their composite configurations as well as in many of the individual variables that contribute (potentially in a non-additive manner; Meyer et al., 1993) towards each organizational configuration.

Variables (and Response Scales)	IEt	EEr	IEr	EEt	ANOVA
Relationships with VCs, 1-5	3.57 (.68)	3.29 (.81)	2.26 (.61)	3.48 (1.12)	4.79** (EEt, EEr, IEt > IEr)
Relationships with corporate executives, 1-5	3.41 (.77)	3.53 (.74)	3.75 (.94)	3.16 (.71)	.997
Autonomy of unit, 1-3	2.42 (.47)	1.74 (.41)	1.46 (.26)	2.67 (.32)	27.37*** (IEt > EEt, IEr; EEr > EEt)
Syndication of investments, 1-4	3.03 (.69)	3.33 (.73)	1.50 (.50)	3.70 (.35)	17.55*** (EEt, EEr, IEt > IEr)
Selecting and exiting ventures, 1-5	4.57 (.50)	4.24 (.70)	4.07 (.87)	4.45 (.72)	1.68
Building ventures, 1-5	3.41 (1.24)	2.59 (.95)	4.43 (.73)	1.95 (.64)	12.01*** (IEr, IEt > EEt, EEr)
Focus on measures of financial performance, 1-7	6.43 (.68)	4.89 (1.73)	4.79 (1.82)	5.80 (1.86)	5.69*** (IEt > EEt)
Use of equity-based compensation for executives, 1-5	2.57 (1.09)	1.71 (.90)	1.26 (.38)	2.43 (1.46)	5.51** (IEt > EEt, IEr)

Table 4-4 Mean Ratings of Elements of Organizational Profile for Corporate Venture Unit Types

Note:

IEt = Internal Exploiter unit, EEr = External Explorer unit, IEr = Internal Explorer unit, EEt = External Exploiter unit.

Standard deviations are shown in brackets. Tests are two-tailed. Post-hoc comparisons employ the Scheffe test.

+ p < .10 * p < .05 ** p < .01 *** p < .001

Hypothesis 2 was concerned with the cross-sectional performance of the venture unit, positing that the greater a unit's fit to its ideal type, the better its cross-sectional performance. We found mixed support for this hypothesis. Table 4-5 shows the results of ordinary least squares regression analysis of fit measures on the three dependent variables examining different

dimensions of venture unit performance (i.e. financial, technological and entrepreneurial dimensions of performance).

	Financial Performance		Technological Performance		Entrepreneurial Performance	
Fit with nearest strategic profile ideal type	.003 (.07)		.031 (.06)		-.086 (.06)	
Fit with nearest organizational profile ideal type	.125 (.07)	+	.213 (.07)	**	.125 (.06)	*
Venture unit age (control)	.157 (.06)	**	.007 (.06)		-.090 (.05)	+
Number of employees (control)	.057 (.06)		.096 (.06)	+	.059 (.05)	
Region (control)	-.210 (.14)		-.327 (.14)	*	.111 (.12)	
R ² (adjusted)	.17 (.11)		.20 (.13)		.15 (.08)	
F (significance)	2.60	*	2.98	*	2.10	+

Table 4-5 OLS Regression: Impact of Fit with Ideal Type on Performance

Note:

Figures in columns are standardized Beta Coefficients. Standard errors are shown in brackets. Tests are two-tailed.

+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

In Table 4-5 the key independent variables are (1) the proximity (or fit) of the venture unit to the closest ideal strategic profile, and (2) the proximity of the venture unit to the closest ideal organizational profile. It is evident that organizational fit is most closely associated with enhanced venture unit performance: the organizational fit coefficient is significant at $p < .10$ in all models in Table 5. What this implies, in practice, is that the greater the alignment between the elements of a unit's organizational profile, the better the unit's performance. This is what we would expect, and it provides support for the central proposition of this study. Interestingly though, the alignment around strategic objectives does not have any discernible impact on venture unit performance. The results suggest that, to some degree, a CV unit's choice of which strategic objectives to pursue is less important than gaining coherence among the elements of its internal organization.

Performance Variables	IEt	EEr	IEr	EEt	ANOVA
Financial performance	3.32 (.41)	2.89 (.68)	2.80 (.51)	3.09 (.32)	1.30
Technological performance	3.22 (.57)	3.17 (.71)	3.00 (.41)	2.96 (.51)	.41
Entrepreneurial performance	3.49 (.64)	3.31 (.61)	3.15 (.60)	3.44 (.48)	.00

Table 4-6 Mean Ratings of Dimensions of Performance for Corporate Venture Unit Types

Note:

IEt = Internal Exploiter unit, EEr = External Explorer unit, IEr = Internal Explorer unit, EEt = External Exploiter unit.

Standard deviations are shown in brackets. Tests are two-tailed.

+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

We also ran a series of ANCOVA tests (controlling for the age of the venture unit and the number of venture unit staff) which found that ideal type membership was not significantly associated with venture unit financial performance ($F = 1.30, p = .26$), technological performance ($F = .41, p = .53$) or entrepreneurial performance ($F = .00, p = .97$)¹. These are reported in Table 4-6. These suggest that none of the CV unit types exhibit superior performance along these three performance dimensions. They may provide some indication of equifinality of outcomes across different ideal types, although these tests should be interpreted with due caution given that our measures relate to performance against expectations², rather than to absolute levels of performance.

Finally, Hypotheses 3a and 3b examined the issue of venture unit survival. Here we developed two arguments: one relating to the fit of units with ideal type profiles (Hypothesis 3a); the other relating to whether the surviving units are exploitation- or exploration-oriented (Hypothesis 3b). We ran binary logistic regression (refer to Table 4-7) to test these hypotheses. We found, consistent with Hypothesis 3b, but contrary to Hypothesis 3a, that the survival of CV units was positively associated with membership of exploitation-oriented venture types (especially where organizational profile is used to classify the venture units into types) and not with ideal type fit. Specifically, the odds of CV units surviving to 2003 increased by 6.35 percent (i.e. the exponent of $\beta = 1.848$) for exploitation-oriented (versus exploration-oriented) units.

¹ These statistics resulted from ANCOVAs using organizational profile to classify the venture units into types. They are consistent with the findings of tests using strategic profile to classify the venture units.

² It should be noted, however, that the CV unit types showed no significant differences ($p < .05$) in terms of their financial and entrepreneurial objectives (along parallel measures to those for CV unit performance, assessing the importance of each performance item to the unit). Significant differences in objectives were only found for technological objectives: with External Explorer units being more oriented towards technological objectives than External Exploiter units ($F = 3.25, p = .03$).

Variables	Survival Status
Fit with nearest strategic profile ideal type	-.241 (.30)
Fit with nearest organizational profile ideal type	.183 (.30)
Membership of exploitation-oriented unit	1.848 (.65) **
Venture unit age (control)	.084 (.29)
Number of employees (control)	-.136 (.24)
Region (control)	.929 (.46) *
-2 Log likelihood	84.07
Hosmer and Lemeshow chi-squared ratio	17.220 *
R ²	.39

Table 4-7 Logistic Regression: Variation in Corporate Venture Unit Survival

Note:

Figures in columns are Beta Coefficients based on standardized independent variables. Standard errors are shown in brackets.

Tests are two-tailed.

Nagelkerke R² statistic reported.

+ p < .10 * p < .05 ** p < .01 *** p < .001

The higher likelihood of survival amongst exploitation-oriented units is also vividly demonstrated in counts of active and inactive units: 13 of 45 external explorer units, and 3 of 7 internal explorer units, have closed over the study period; whereas the equivalent figures for the internal exploiter and external exploiter types are merely 2 of 23, and 1 of 10³. Contingency-based arguments thus appear more reflective of longitudinal venture unit performance than do configurational ‘fit’ arguments.

4.5 Discussion and Conclusions

The results offered some support for all our propositions: Corporate venture units develop organizational profiles that are to some extent aligned with their strategic objectives; greater internal alignment around particular organizational profiles is associated with higher cross-sectional performance; and exploitation-oriented venture units tend to survive for longer than exploration-oriented units. However, we should also be clear that the significance of the findings was fairly modest. Hypothesis 1 was supported, indicating that the configurations we theorized are found in practice, but the proportion of venture units whose organizational profiles matched their strategic profiles was only 40 percent. And in terms of Hypothesis 2, while fit with the

³ These analyses classify CV units on the basis of their nearest organizational profile. The equivalent figures where strategic profile is used to classify venture units are: 5 / 34 for External Exploiter units; 10 / 26 for Internal Explorer units; 0 / 3 for Internal Exploiter units; and 6 / 27 for External Explorer units.

organizational profiles of the four ideal types was associated with improved cross-sectional performance, the level of fit with the strategic profiles of the ideal types showed no sign of being important. It is worth exploring the reasons for these modest findings before broadening our discussion to consider the implications of our research for configuration theory and for strategic management.

4.5.1 Explaining the Configuration Findings

An important starting point in terms of making sense of the results is that little is known definitively regarding the determinants of venture unit success, despite the occurrence of corporate venturing over at least the past three decades. While there were previous waves of venturing in the 1970s and 1980s, the majority of the current crop of venture units were established with limited attempts to learn from prior waves (Chesbrough, 2002). Hence there was a high level of experimentation in terms of both the objectives they pursued, and the organizational profiles they adopted. One common approach in the late 1990s was to adopt practices that had worked in the field of venture capital (Brody & Ehrlich, 1998; Chesbrough, 2000). Our sense from the research interviews is that some of this learning was inappropriate and that VC-like practices (such as the use of carried interest for venture unit managers) were used somewhat indiscriminately – in both venture units where they were appropriate, as well as in some where they were not (Birkinshaw & Hill, 2003). This may help to explain the modest support for Hypothesis 1.

A second observation, again drawn from our research interviews, is that many venture units were formed without clear objectives or mandates agreed with their parent companies (refer to Appendix 4-A for descriptive data on the measurement items associated with financial, technological and entrepreneurial objectives in our study: the high mean scores and levels of correlation between these items indicate the varied and multitudinous nature of the objectives of the CV units we sampled). It was not unusual, for example, for a single unit to take on internal explorer and internal exploiter roles for their parent company, but without any attempt to segment the two activities or the structures, systems or people responsible for each. Such lack of agreed mandates (or ‘charters’), and an attendant profusion of venture unit objectives, is a fairly common observation in corporate venturing literature (cf. Burgelman & Valikangas, 2005; Campbell et al., 2003; Chesbrough, 2002; Dushnitsky, 2006; Keil, 2002; Maula, 2007). The

presence of these hybrid units may help to explain the weak fit between organizational and strategic profiles. And it may also help to explain the mixed findings for Hypothesis 2. Given blurred objectives, the venture unit could still perform well by creating an internally-consistent organizational profile that allowed it to at least deliver on some of those objectives. It could not, however, find a way of satisfactorily delivering on all of those objectives simultaneously. For example, Philips' CV unit was largely successful in its external explorer activities, but struggled enormously to deliver on its internal exploiter objectives.

At a more general level, these findings may suggest specific boundary conditions on the formation of coherent, synergistic configurations (Doty & Glick, 1994; Miller, 1986, 1996). These may include volatile and highly uncertain institutional environments in which 'experiments' with new organizational forms are frequently curtailed, and where the possibility of learning is therefore constrained. In such environments, mimetic isomorphism may be rife, as may the unwitting creation of hybrid structures. Such conditions may mitigate against the evolution and diffusion of configurations approximating the ideal types.

4.5.2 Implications for Configuration Research

Our use of a configurational approach to understanding venture unit types suggests a number of implications for theory. As per Ketchen et al.'s (1997) meta-analytic findings, we found overall support for the proposition that fit with ideal types improved performance. Two nuances need, however, to be highlighted: (1) CV unit survival was not explained by ideal type fit, and (2) our analysis indicated that strategic fit mattered less to (multiple dimensions of) performance than did congruence between the organizational elements of the configuration.

Survival, to the best of our knowledge, is not a frequently studied outcome measure in configurations research (see Ketchen et al., 1997). It appears that our study brings into stark relief, once again, the divergent antecedents of these two outcome variables – performance and survival (Meyer & Zucker, 1989). While internal consistency helps CV units to perform better, what appears to matter to decisions regarding unit survival are the objectives of the units. Those that have longer-term and more uncertain objectives are more easily closed down when other priorities take precedence within the parent company. It is, hence, questionable to what extent current configurations logic can help explain survival, especially in highly-socially embedded

contexts (such as corporate venturing) where multiple internal parties impact decisions on whether an organizational unit is to survive or not.

Furthermore, we found that structural fit mattered to CV unit cross-sectional performance while strategic fit did not appear to. While alignment between strategy and structure is a central tenet in much strategic management literature (Chandler, 1962), as well as an assumption of configurational theory, this finding seems consistent with an interesting theme in the strategy literature that under certain conditions “any old strategic plan will do” (Weick, 1987: 222; see also Egelhoff, 1993)⁴. This line of thinking is not meant to devalue careful strategic analysis, but it highlights that in particular circumstances, such as when there is enormous uncertainty about the appropriate way forward, it may be more important to mobilize effort around a specific set of objectives than to worry too much about what those objectives are.

4.5.3 Implications for Research on Exploration and Exploitation

Our application of March’s (1991) exploration-exploitation typology to the CV unit context also holds a number of implications for the corporate venturing and strategic management literatures. Traditionally, business development activities such as corporate venturing are thought of as focusing on exploration (i.e. on the creation of novelty) (e.g. Dushnitsky & Lenox, 2005, 2006; Wadhwa & Kotha, 2006), but a more holistic approach, as adopted here, shows that in fact there can be a significant exploitation component to business development. Indeed, both the internal exploiter and external exploiter venturing roles are established primarily as vehicles for the exploitation of existing assets and capabilities, although invariably they also possess exploration-oriented elements.

Two further points should be made on the exploration versus exploitation dimension. First, while we in no way intend to suggest that survival should be regarded as the ultimate goal of venture units (McGrath, 1999), we observe that, regardless of the venture unit’s performance, the survival rate of exploitation-oriented units is greater than that of exploration-oriented units. This creates interesting practical challenges for the managers of CV units seeking to defend their record in the face of the often-changing demands of their corporate parents. There are no simple

⁴ An alternative explanation is that our strategic profile dimensions may not accurately reflect the most significant strategic choices open to venture unit managers.

ways of doing this: it likely involves emphasising the long-term value such a unit can provide to the corporation, building networks of supporters in the parent company, and showcasing success stories. Ultimately, however, it is the responsibility of parent company executives to manage the tension between exploration and exploitation. Plentiful examples exist of where an economic downturn or a change in corporate strategy has resulted in a venture unit being closed down, despite good evidence that it was performing well (Fast, 1979, 1981).

The second point is that the orthogonal distinction between exploration and exploitation employed here (cf. Gupta et al., 2006) is not always clear-cut in practice. Exploration and exploitation appear better understood, at least in the context of corporate venturing, as meta-level strategic objectives that define how priorities are set and that determine the relative emphasis on different activities in the venture unit, rather than as discrete activities. The four different types of venture unit described in this research often look quite similar to one another in close-up, as they all engage in activities such as investing, nurturing, networking, and exiting. But, on closer inspection, the relative focus on each activity varies, and the internal management processes that shape executive decision-making are often dramatically different. For example, internal explorer units are primarily concerned with exploration, but unless their ventures are able to show signs of exploiting their ideas or opportunities within 2-3 years, they cannot expect to survive. Internal exploiter units, in contrast, are geared towards exploitation, but in order to deliver on that objective they have to identify or create new sources of value first.

4.5.4 Conclusions

To conclude, this chapter sought to develop and test a typology of corporate venture units based on a deeper understanding of their strategic role in the corporation. Building on configuration theory, we showed that the internal alignment of venture unit relationships, systems and activities was important for venture unit performance, while at the same time no real performance differences existed across unit types. Also, building on March's (1991) distinction between exploration and exploitation, we showed that survival after two years could be attributed in part to the extent to which a venture unit engaged in exploitation. While the findings of this research are specific to the context of corporate venturing, it is hoped that the ideas and methods used can find broader applicability to other aspects of business development in large corporations.

APPENDIX 4-A

ITEMS MEASURING CV UNIT OBJECTIVES

Variable	Mean	S.D.	1	2	3	4	5	6	7	8
Financial Objectives										
1. Financial return to the corporation (e.g. IRR)	2.71	.53								
2. Contribution to top-line growth	2.03	.86	.05							
3. Increased valuation of corporate stock	1.75	.72	.04	.39						
Technological Objectives										
1. Creation of breakthrough technology for the corporation	2.34	.70	-.09	.08	-.06					
2. Investment in disruptive technologies that potentially cannibalize existing technologies	2.26	.70	-.10	.09	-.01	.40				
3. Development of strategic relationships with external suppliers/customers/competitors	2.21	.73	.10	.01	.03	.17	.20			
Entrepreneurial Culture Objectives										
1. Creation of stronger entrepreneurial culture	2.12	.72	.22	-.02	.28	-.05	.09	-.07		
2. Attraction of talented new employees	1.82	.75	.19	.23	.26	.10	.09	.05	.52	
3. Retention and motivation of employees	1.81	.71	.19	.30	.33	.07	.15	.07	.50	.78

Table 4-8 Means, Standard Deviations, and Correlations between CV Unit Objectives

n = 95. All correlations with absolute values greater than .21 are significant at the .05 level.

CHAPTER V

AMBIDEXTERITY AND SURVIVAL IN CORPORATE VENTURE UNITS⁵

5.1 Introduction

This chapter explores in yet more depth than in the preceding one the roles that exploration and exploitation (March, 1991) play in the survival of corporate venture units. In particular it argues that, contrary to traditional conceptions of corporate venture units as vehicles for exploration exclusively, acting ambidextrously (Duncan, 1976; Gibson & Birkinshaw, 2004; Tushman & O'Reilly, 1996) may have important legitimating effects for corporate venture units which serve to enhance their (always precarious) odds of survival. It thus continues our quest to shed more light on a key question for this domain, namely: which processes, systems and structures are associated with superior corporate venture unit survival?

Drawing on March's (1991) distinction between the processes of exploration and exploitation, we argue once again that the dominant view of CV units as vehicles for exploration (Burgelman, 1983; Galbraith, 1982) is too simplistic. According to this view, CV units have been seen as a means of separating the innovative (exploratory) from the operating (exploitative) systems of large firms (Burgelman, 1985). This is consistent with a broader set of arguments in organization theory that the structural separation of exploratory from exploitative activities is an effective way of achieving organizational ambidexterity (Duncan, 1976; O'Reilly & Tushman, 2004; Smith & Tushman, 2005; Tushman & O'Reilly, 1996).

In contrast to the prevailing point of view, we argue that CV units need to develop ambidextrous capabilities of their own if they are to have an ongoing role as part of the parent

⁵ This chapter is co-authored with Julian Birkinshaw. An earlier version was presented at the Academy of Management Annual Meeting in August 2006, where it received an Entrepreneurship Division Best Paper Award. It was published as: Hill, S. A., & Birkinshaw, J. 2006. Ambidexterity in corporate venturing: Simultaneously using existing and building new capabilities. *Academy of Management Proceedings*, C1-C6. We would like to thank Rick Delbridge, Felipe Monteiro and Freek Vermeulen for their valuable comments on earlier versions.

firm. Specifically, we argue that CV units need to make some use of the existing capabilities of the parent company (exploitation) otherwise they risk being spun off because of their low strategic importance; yet they also need to build their own distinct capabilities (exploration) otherwise they risk being folded back into the parent firm or sold because of their lack of value-added. CV units, in other words, face a constant tension between parent firm demands for exploitation and exploration. Strong anecdotal evidence of high CV failure rates (Burgelman & Valikangas, 2005; Fast, 1981) suggests how difficult this tension is to manage.

By framing the challenge facing CV units in this way, we depart from the dominant structural perspective on ambidexterity in suggesting that exploration and exploitation can effectively co-exist *within* a single organizational unit, where an appropriate organization context exists (Gibson & Birkinshaw, 2004; Jansen, Van Den Bosch, & Volberda, 2006). Furthermore, we suggest that ambidexterity may play an important role in engendering perceptions of legitimacy amongst CV units' key constituencies, enabling their long-term survival in contexts seemingly antithetical to their existence (Czernich, 2004).

This chapter examines two related issues: first we examine how CV units develop a *relational context* – defined in terms of their relationships with key internal and external constituencies - to foster ambidexterity; second, we consider the impact of ambidexterity – defined as the ability to simultaneously use existing and build new capabilities - on the likelihood of CV unit survival. We test and find support for our propositions using primary data from 95 corporate venture units, collected over a three-year period. Our dataset overcomes certain crucial limitations of previous studies in this domain – it includes both internally- and externally-oriented venture units (Sharma & Chrisman, 1999); it includes measures of strategic and organizational antecedents of ambidexterity not available from archival sources; and represents, to the best of our knowledge, the most systematic study of CV units, from primary sources, to date.

The chapter contributes to the literatures on corporate venturing, ambidexterity and organizational legitimacy. Specifically, we envisage two primary contributions. First, our arguments shift the focus from purely material views of ambidexterity towards a more balanced view that *recognizes the social and symbolic contexts in which ambidextrous organizations arise and operate*, and the impact that these - over and above any performance benefits ambidexterity

may confer - may have on organizational survival. Second, we advance a *more nuanced view of corporate venture units as viably ambidextrous in their form*, rather than as units focused exclusively on exploration. In other words, by recognizing the social and symbolic contexts in which corporate venture units operate we are able to show that the combination of exploratory and exploitative activities, as well as their couching in ambidexterity rhetoric and narratives, may provide the legitimacy such units require for their survival.

5.2 Theory and Hypotheses

5.2.1 Exploration, Exploitation and Corporate Venture Units

A recurring theme in many organizational literatures is the tension the organization faces between seemingly conflicting demands in its task environment. Perhaps the most pervasive tension is between the demands for exploration and exploitation (Gupta, Smith, & Shalley, 2006; March, 1991). Exploration involves “experimentation with new alternatives” with returns that are “uncertain, distant and often negative”, and is associated with the organization’s need for adaptability; exploitation is the “refinement and extension of existing competencies, technologies and paradigms” with returns that are “positive, proximate, and predictable”, and is associated with the organization’s need for alignment (March, 1991: 85)

Two important points for this study emerge from the exploration and exploitation literature. First, exploration and exploitation can be conceptualized either as poles on a single continuum or as discrete variables (Gupta et al., 2006). One common approach uses a single ‘search distance’ (Cyert & March, 1963) dimension where local search is equated with exploitation and distant search with exploration (e.g. Martin & Mitchell, 1998; Rosenkopf & Nerkar, 2001; Stuart & Podolny, 1996). The alternative approach, which we adopt here, is to conceptualize exploration and exploitation as distinct and separate modes of activity (e.g. He & Wong, 2004; Katila & Ahuja, 2002; Koza & Lewin, 1998; Rothaermel & Deeds, 2004). This approach is preferred because of its greater congruence with March’s (1991) initial theory. Accordingly, our operational definition builds on those proposed by Danneels (2002) and Katila and Ahuja (2002): exploration involves the development of capabilities for the firm, while exploitation involves the use of existing firm capabilities.

Second, while there is indeed tension between the activities of exploitation and exploration, studies have shown that it is possible for organizations to become ambidextrous, i.e. capable of delivering on both activities at the same time, and that ambidexterity is correlated with superior performance (Gibson & Birkinshaw, 2004; He & Wong, 2004; Lubatkin, Simsek, Ling, & Veiga, 2006). Achieving high levels of exploitation and exploration at the same time is difficult not only because of their competing calls on attention and resource allocation systems, but also due to the self-reinforcing nature of each mode of activity (Levinthal & March, 1993; Levitt & March, 1988). Due to positive feedback between experience with an activity and competence at performing that activity, organizations are likely to pursue the mode of learning in which they acquire more experience in a self-reinforcing cycle, such that the dominant mode of activity threatens to drive out the other mode.

The means by which an organization, or an organizational unit, may pursue exploration and exploitation at the same time are only partially understood. One line of thought, and the dominant view in the ambidexterity literature, suggests that exploration-oriented and exploitation-oriented activities are sufficiently different that they need to be kept apart – either by placing them in separate operating units (Benner & Tushman, 2003; Duncan, 1976; Galbraith, 1982; Gupta et al., 2006; Tushman & O'Reilly, 1996), or by alternating them (Rothaermel & Deeds, 2004; Siggelkow & Levinthal, 2003). An alternative argument suggests that exploration and exploitation can coexist even within the same operating unit if sufficient care is given to the development of a supportive organization context (Danneels, 2002; Gibson & Birkinshaw, 2004; Holmqvist, 2004; Jansen et al., 2006).

Although widely used in the field of organization studies, the concepts of exploration, exploitation and ambidexterity have received limited application in corporate venturing literature (see Keil, Maula, Schildt, & Zahra, 2008, and Schildt, Maula, & Keil, 2005, for recent exceptions examining the impact of investment relatedness on exploratory and exploitative innovation). This is possibly a consequence of the dominant view that holds corporate venturing units to be vehicles of exploration only. From their inception, CV units have been viewed as a means to separate the innovative from the operating systems of large firms (Burgelman, 1985), and most studies have focused on the explorative role of CV units (e.g. Burgelman, 1983; Galbraith, 1982; Wadhwa & Kotha, 2006) and their impact on exploration-oriented measures

such as innovation and early recognition of technological opportunities (Dushnitsky & Lenox, 2005; Rice et al., 2000).

We propose a more nuanced view that places greater emphasis on the symbolic context surrounding CV units. We suggest that, to be effective, CV units need to engage in both exploration and exploitation, and that if either or both activities are deficient the CV unit is unlikely to survive. There are both substantive and symbolic aspects to this argument. Substantively, VC units are always created to build – to some degree - on the existing assets of the firm, whether these are human, financial, or technological in nature. While exploration of new possibilities may be the primary or overarching goal, it can rarely be pursued without a strong foundation in the existing assets or capabilities of the firm. At a more symbolic level, CV unit managers are likely to worry about their legitimacy and survival because of the mixed track record of CV units (Chesbrough, 2000). We would therefore expect them to expend considerable amounts of effort in balancing the expectations of the various different stakeholders to whom they are accountable, some of whom will care more about developing new ideas and technologies (exploration) while others are more focused on short-term profitability (exploitation).

Building on the ambidexterity, corporate venturing and organizational legitimacy literatures, we turn now to developing a framework for analyzing corporate venturing ambidexterity, its antecedents and its implications for CV unit survival. We look first at how CV units engage with their key constituencies to attain ambidexterity, and then at the relationship between corporate venturing ambidexterity and survival (see Figure 5-1).

5.2.2 Relational Context and Ambidexterity

What are the contextual features that enable a CV unit to become ambidextrous? While extant theory focuses primarily on the role of formal organizational structure in creating ambidexterity, typically via the structural separation of exploration from exploitation (e.g. Duncan, 1976; O'Reilly & Tushman, 2004), some recent literature has suggested that other organizational dimensions may enable ambidexterity within single business units. In particular, Gibson & Birkinshaw (2004) posited that a business unit's 'behavioral context' – i.e. the "carefully nurtured, deeply embedded corporate work ethic that triggers the individual-level behaviors of entrepreneurship, collaboration and learning" (Ghoshal & Bartlett, 1994: 12) – may

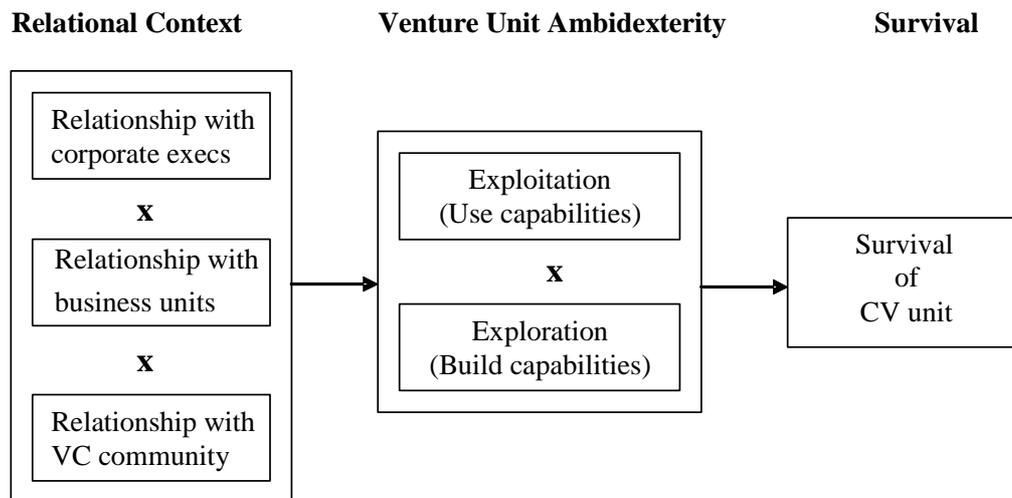


Figure 5-1 Venturing Ambidexterity Model

facilitate both short-term adaptation and longer-term alignment within individual business units.

Likewise, our focus here on the CV unit level of analysis makes traditional notions of structural separation less relevant to understanding the origins of ambidexterity in this context. Rather, we look to understanding ambidexterity in the corporate venturing context in terms of its social origins. Specifically, we focus on the CV unit's *relational context* - the specific set of relationships, internal and external to the firm, with key resource holders in which the CV unit is embedded. Drawing on a social capital perspective (Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998), we conceptualize the relational context of corporate venturing in terms of the broad set of resources that become available to the CV unit through its interaction with key actors in its network, and which thereby shape its behavior. This view of context differs significantly from the concepts of *structural context* (Bower, 1970), in which behavior is shaped by formal rules and incentives, and *behavioral context* (Ghoshal & Bartlett, 1994), in which behavior is shaped by the tacit norms and values of the organization. Here, instead, context is characterized by a combination of access to resources from other actors (Pfeffer & Salancik, 1978; Pierce & White, 1999) *plus* the normative and social cues these actors provide. This combination of resource dependency and social support is highly relevant to the CV phenomenon, in terms of the complex web of relationships CV units build with other actors (in their parent companies and with external parties) to ensure their survival (e.g. Chesbrough, 2000; Dushnitsky, 2006; Maula

et al., 2005). Social and relational elements are also increasingly being incorporated into the organizational ambidexterity literature (Atuahene-Gima & Murray, 2007; Jansen et al., 2006; Lubatkin et al., 2006).

We suggest that the CV unit's relational context is defined around three principal sets of resource holders - the senior managers in the parent firm, the business units in the parent firm, and members of the venture capital (VC) community. While some venture units may also engage with additional parties (such as entrepreneurial young firms, university scientists, suppliers or consumers), our research interviews suggested that these three sets of actors represent the principal network of resource holders with which CV unit managers typically engage (see Dushnitsky, 2006, for an overview of CVC research also focusing on relationships with parent companies and independent venture capitalists as key investment partners).

Because many of the resources required for the CV unit to deliver its objectives are controlled by others, a 'brokering' role (Hargadon, 2002; Hargadon & Sutton, 1997; Obstfeld, 2005) is played by the managers of the CV unit to pull together those resources in order to develop new combinations (Schumpeter, 1934, 1942) or new configurations (Eisenhardt & Martin, 2000) on behalf of their parent firm (Stevenson & Jarillo, 1990). CV units draw on their social capital to broker the flow and combination of resources (Ahuja, 2000; Mitchell & Singh, 1996; Zaheer & Bell, 2005) between their three principal sets of resource holders. Consistent with the RBV perspective's broad definition of resources (Barney, 1991; Wernerfelt, 1984), resources brokered by CV units may include the capabilities (individual and organizational), knowledge and physical assets that are combined to spot new combinations, and to develop them. Less tangible resources, such as endorsement and influence, may also be brokered within corporate venturing networks.

However, unlike certain traditional notions of brokerage (cf. Obstfeld, 2005) premised on opportunistic actions by a self-interested broker to 'play off' disconnected parties, brokerage in this context relates to the 'connecting' of social actors to enable resource exchange and combination. Indeed, while the *modus operandi* of the principal resource holders in the corporate venturing context may differ and their interests may not completely coincide, strong elements of mutual interdependence also characterize their relationships. CV units are created to serve charters that would otherwise be difficult for their parent firms to effect; and independent

venture capitalists are increasingly aware of complementarities offered by corporate investment partners (Maula et al., 2005, 2007; Maula & Murray, 2002). As suggested by recent research (e.g. Gulati & Sytch, 2007; Villanueva, Van de Ven, & Sapienza, 2007), such mutual interdependence creates fertile ground for resource flows between CV units and key social actors, enabling the mobilisation of resources for their portfolio of new ventures.

Resource flows brokered by CV units enable them to engage simultaneously in both exploration and exploitation on behalf of their parent companies, i.e. to act ambidextrously. At first glance, it may seem that parent companies would act exclusively as a source of resources for exploitation, and VCs exclusively for exploration. Dominant conceptions of CV units as 'islands' of exploration within parent company 'seas' of exploitation certainly reinforce this view. However, research suggests this is not necessarily so (Dushnitsky, 2006; Schildt et al., 2005). Consider, first, the key resource holders in parent companies: senior corporate executives in the parent firm and sibling business units. While these actors certainly provide access to exploitation-oriented resources, such as the parent's brand and its existing products, they also provide access to exploration-oriented resources, such as technology platforms on which future products might be built, and opportunities to combine existing assets in novel ways. Maula (2007) suggests, in fact, that parent company motives for undertaking corporate venturing span three categories: learning motives, option building motives, and resource leveraging motives. Each one of these motives has sub-elements that are split between exploiting the existing capabilities of the firm, and exploring new technologies and/or markets for the firm.

Similarly, research has indicated that the value added by corporate investors to ventures (e.g. Block & MacMillan, 1993; Dushnitsky, 2006; McNally, 1997) also combines exploration and exploitation. One important form of value added by corporate investors is access to complementary resources such as distribution channels and production facilities (i.e. resources which draw on existing firm capabilities), as well as to parent firms' R&D stocks, market intelligence and technology forecasts (i.e. exploratory firm activities). Another important contribution of the corporate parent is reputational, providing an endorsement effect for new ventures in their product market or the capital markets (Maula et al., 2005, 2007; McNally, 1997; Stuart, Hoang, & Hybels, 1999). Again, the point is that senior executives and sibling business units provide access to a complex mix of resources with exploitation-oriented and exploration-oriented components.

If we turn to the third set of principal resource holders, the venture capital community, CV units may also broker a range of different resources (Maula et al., 2005; Maula & Murray, 2002) from this constituency. The VC community provides an important source of new investment ideas ('deal flow') for CV units (McNally, 1997; Siegel, Siegel, & MacMillan, 1988; Sykes, 1986), whether through informal communication mechanisms or the formal participation of corporate investors in syndicated investments with VC partners. Venture capitalists also possess highly developed 'enterprise nurturing' skills (i.e. early-stage venture establishment skills) that complement the more industry-specific skills parent companies bring to developing new ventures (Maula et al., 2005). These benefits may equally be applied by the CV unit to investing in ventures close to existing firm capabilities (i.e. exploitative activities) or to ventures that are distant from the existing technologies and/or markets of the parent firm (i.e. explorative activities). Also, as per the parent company endorsement effects for new ventures (Stuart et al., 1999), close relationships between VC firms and corporates help legitimate new ventures initiated by CV units.

Despite their commonality of interest in generating new resource combinations, relationships between CV units and members of these three constituencies entail communication across significant boundaries of both a cognitive and organizational nature (Aldrich & Herker, 1977; Tushman, 1977). Cognitively, the other actors inhabit different 'thought worlds' (Dougherty, 1995) to CV unit members, with their own sets of scripts and schemas. For example, domain and synergy issues are frequently contested by CV units and the operating system of the parent company (Burgelman, 1985), while different emphases on short-term returns and positions on the appropriation of intellectual capital may strain relations between CV units and VCs (Breyer & Golden, 2001).

Consequently, CV units may need to expend considerable effort, engaging in frequent social interaction, to develop strong relationships with each of these groups in order to gain access to the resources that are then brought together to form new resource combinations. Such an arrangement means the CV unit will be better placed to capture the complementarities between the different resource bases of the three sets of actors (Maula et al., 2005); it also avoids

the potentially deleterious consequences of getting too close to one particular set of actors⁶. In sum, then:

***Hypothesis 1:** The stronger the relationships between the CV unit and (a) senior executives in the parent firm, (b) other business units, and (c) the VC community, the higher the level of venturing ambidexterity. The effect will be strongest when there are strong relationships with all three sets of actors.*

5.2.3 Venturing Ambidexterity and Survival

The second part of our framework suggests that ambidexterity will be positively related to CV unit survival. Our reasons are, however, very different from those typically offered in the ambidexterity literature with its focus on ‘material’ long-term performance benefits accruing to ambidextrous organizations. Instead, we turn to institutional theories (DiMaggio & Powell, 1983; Meyer & Zucker, 1989; Scott, 1987) with their emphasis on the role of legitimacy over the fates and fortunes of organizations. In particular, institutional analyses of entrepreneurial contexts (e.g. Aldrich & Fiol, 1994; Lounsbury & Glynn, 2001; Rao, 1994) suggest ways in which ambidexterity may serve to legitimate corporate venturing units and enhance their likelihood of survival.

Corporate venturing units face many similar challenges to independent ventures which make gaining legitimacy both critical for their survival as well as extremely difficult to achieve. Both engage in activities that are new to an organization or an institutional field, and are consequently likely to be little recognized or understood by their constituencies (Aldrich & Fiol, 1994; Yeow, 2006). Furthermore, they may require time to demonstrate successful performance, along metrics that may initially be little understood or accepted. As such, there are few clear bases for interaction with potential partners, exacerbating difficulties in resource acquisition, so critical to organizations in their formative stages. The lack of widely accepted ‘models’ of corporate venturing further compounds the challenges these units face in being understood and

⁶ There is good anecdotal evidence in the literature that there are risks for the CV unit in getting too close to any one of the three sets of actors: the CV unit loses its ability to make independent business judgements if it is too close to senior executives, it loses its reason to exist if its activities become too close to those of the business units, and it loses its strategic value to the parent firm if it becomes too closely aligned to the interests of its VC partners (Block & MacMillan, 1983; Burgelman & Valikangas, 2005).

gaining acceptance (Chesbrough, 2000, 2002). Liabilities of newness for both corporate venturing units and independent ventures are thus considerable (Stinchcombe, 1965).

Ambidexterity can be seen as one means through which the CV unit builds legitimacy and thereby increases its chances of survival (defined here as the decision by the parent firm to continue to invest in the CV unit). In the following paragraphs, we outline how ambidexterity can be viewed as a legitimating device that helps to engender both cognitive and socio-political legitimacy for the CV unit (Lounsbury & Glynn, 2001). Cognitive legitimacy refers here to the extent to which internal and external constituencies *comprehend* the activities and function of a given CV unit, whereas socio-political legitimacy indicates the extent to which onlookers *accept* the charter of the unit as appropriate and desirable (Aldrich & Fiol, 1994; Suchman, 1995⁷).

In terms of cognitive legitimacy, we suggest that the concept of ambidexterity may help CV units to overcome the barriers to comprehension faced by many observers. According to personal construct theory (Kelly, 1955), individuals organize constructs into systems of meaning that they then use to develop ‘theories’ (schemas) about their world. These, in turn, guide action as well as constrain the extent to which individuals can comprehend new initiatives. In corporate contexts, organization unit identity frequently becomes a touchstone against which new initiatives are comprehended (Lounsbury & Glynn, 2001; Reger et al., 1994). It follows that to overcome the cognitive obstacles of entrenched identity beliefs, new initiatives are best framed along existing schemas compatible with – or at least not in opposition to – valued identities (Dougherty, 1995; Dougherty & Hardy, 1996; Fiol, 1991; Reger et al., 1994). The rhetoric and substance of ambidexterity is highly compatible with framings of this nature: in drawing on existing parent firm capabilities (exploitation), ambidextrous CV units can clearly locate their activities within the existing schemas and identity of the parent firm, enabling comprehension by internal constituencies. Similarly, ambidextrous CV units may draw attention to their exploratory activities in gaining cognitive legitimacy in the eyes of the venture capital community – these activities being more aligned to the schemas and identities of VC firms.

⁷ Suchman (1995) makes a further distinction by splitting socio-political legitimacy into pragmatic legitimacy (based on audience self-interest) and moral legitimacy (based on normative approval). While this distinction is conceptually valid, the context of the current paper is closer to that of Aldrich and Fiol (1994), hence we employ their terminology here.

In terms of socio-political legitimacy, ambidexterity - in both its symbolic and substantive aspects - can help to increase the acceptability of the CV unit to internal and external constituencies. As discussed before, the tensions facing the CV unit are complex: it should not be seen as too close to the core activities of the parent firm, otherwise it is either redundant or a threat; and it should not be seen as deviating too far from the established domain of the parent firm, otherwise the potential for strategic leverage is lost and the unit's relevance is in doubt. Similarly, experienced venture capitalists seek out those CV units that offer the rare combination of a commitment to high financial returns (e.g. by selling off successful ventures) as well as the ability to leverage the brand and/or technical skills of the parent firm, whilst not possessing complete homogeneity of interests with the parent firm (Breyer & Golden, 2001).

The socio-political demands on CV units have parallels with the institutional pressures on entrepreneurs in nascent industries to gain legitimacy through 'optimal distinctiveness' (Lounsbury & Glynn, 2001: 552): "that is, to balance the need for strategic distinctiveness against that of normative appropriateness". In a similar vein, a study by Czernich (2004) suggested that intrapreneurial ideas that get accepted by large companies tend to possess, or be framed as possessing, an intermediate level of relatedness to the firm's businesses. An ambidextrous identity allows the CV unit to position itself as both similar to (i.e. able to exploit existing capabilities) and different from (i.e. able to build new capabilities) the other activities of the parent firm. Accordingly, we propose a positive relationship between venturing ambidexterity and CV unit survival through the attainment of cognitive and socio-political legitimacy:

Hypothesis 2: *The higher the level of venturing ambidexterity (i.e. the interaction of exploitation and exploration), the higher the likelihood of survival of the CV unit.*

5.3 Methodology and Analysis

5.3.1 Research Design

Please refer to Chapter 4 for a description of the design of the research (specifically, Section 4.4.1 titled 'Research Design').

5.3.2 Dependent and Independent Measures

The bulk of our measures are derived from the responses of CV unit managers to the 2001 mail survey. As no other studies (to the best of our knowledge) have used survey methodologies to examine the structures and management practices in contemporary CV units, we developed the measures drawing on prior literature where possible, as well as on constructs emerging from the exploratory interviews. Using our final sample, we conducted numerous analyses (described below) to verify that our measures were sound.

Survival. A CV unit was considered to be a survivor if it was still active (i.e. continuing to invest in ventures) within its original parent company in December 2003. It is worth noting that previous research has shown CV units to be particularly susceptible to closure during their early years, and in particular, the first 2-3 years of their operation (Gompers & Lerner, 1998). In operational terms, the dummy variable was coded '1' if a CV unit was still active within its parent company late in 2003 (i.e. a survivor unit), and '0' where it was not (i.e. a non-surviving unit)⁸.

Venturing ambidexterity. We chose to develop new measures for the constituent elements of ambidexterity, viz. exploration (building new capabilities for the parent firm) and exploitation (using existing capabilities of the parent firm). This decision was informed by the absence of any widely accepted measure of ambidextrous orientation (Lubatkin et al., 2006), and the focus of current ambidexterity measures on organizational levels of innovation (cf. He & Wong, 2004; O'Reilly & Tushman, 2004; Tushman & Smith, 2004). The latter focus is inconsistent both with the venture unit level of analysis and, more critically, with the broad and varied mandates of CV units (Campbell et al., 2003; Chesbrough, 2002; Keil, 2002; Maula, 2007) - of which innovation is not necessarily a major component. We hence developed our measures of exploration and exploitation based on the capabilities identified in our qualitative interviews. Following a q-sort procedure, these corporate venturing capability items were then assessed for their congruence with exploration and exploitation by four expert raters familiar

⁸ We found only six CV units to not conform clearly to our operational definitions of 'survivor unit' or 'non-surviving unit' at the time of our follow-up: of these, two units had had a majority stake sold off by their respective parent companies; three were reported to be 'operating on a reduced mandate' or 'winding down'; and the future of a further unit was uncertain given the pending merger of its parent company with another firm. While we still coded these units as surviving and included them in the analyses presented here, they do not prove material to the pattern of results attained.

with both corporate venturing, and exploitation and exploration (March, 1991) literatures. The final items constituting each scale are outlined below.

Analytically, we follow Gibson and Birkinshaw (2004) in operationalizing ambidexterity as the product of exploration and exploitation (cf. Schoonhoven, 1981). This approach is consistent with our theoretical interest in those situations where the CV unit is engaging in both activities to a high degree (in comparison to situations where the CV unit is low on one or both)⁹.

Use existing capabilities (exploitation). We captured CV units' use of existing parent company capabilities by asking CV unit managers to indicate the importance to their unit of: (1) "Retention and motivation of our employees"; (2) "Better use of existing corporate assets"; (3) "Creation of spin-out companies"; and (4) "Source of funding for internal entrepreneurs". Response options along a 3-point scale were: 1 = 'not at all important', 2 = 'minor importance', and 3 = 'major importance'. Principal component analysis demonstrated that all items loaded on a single factor, having an eigenvalue of 2.05 and accounting for 51 percent of the variance. Internal reliability was acceptable (Cronbach's alpha = .68).

Build new capabilities (exploration). We examined the extent to which CV units strove to develop new capabilities using the same question and response format as described above. Specifically, CV unit managers were requested to indicate the importance to their unit of the following: (1) "Creation of breakthrough technology for the corporation"; (2) "Investment in disruptive technologies that potentially cannibalize existing technologies"; (3) "Window on emerging technologies"; and (4) "Development of strategic relationships with external suppliers/customers and competitors". Principal component analysis demonstrated that all items loaded on a single factor, having an eigenvalue of 1.99 and accounting for 50 percent of the variance (Cronbach's alpha = .64).

We further examined the psychometric properties of these variables using confirmatory factor analysis. We compared our proposed two-factor model (with each item constrained to

⁹ An alternative operationalization (e.g. He & Wong, 2004) is to focus on the balance between using existing capabilities and building new capabilities, but in the context of this study such an approach would be inappropriate as a CV unit with a 'low-low' rating would be recorded as having the same level of ambidexterity as one with a 'high-high' rating. As a robustness check on our findings, however, we run OLS regression analyses (not reported here) that substituted a 'balance' measure (i.e. the absolute difference between exploration and exploitation) for our ambidexterity measure. This did not attain significance in any of the analyses ($p < .05$).

load only on its anticipated factor) to an alternative one-factor model using AMOS. The proposed two-factor model demonstrated good fit with the data ($\chi^2 = 25.32$, $df = 19$, $p = .15$; $CFI = .94$; $RMSEA = .06$), while the alternative one-factor model exhibited poor fit ($\chi^2 = 75.48$, $df = 20$, $p = .00$; $CFI = .49$; $RMSEA = .17$). This suggests that exploration and exploitation are both theoretically and empirically distinguishable in the corporate venturing context. Convergent validity was also indicated for the two measures of exploration and exploitation by all item loadings being significant ($p < .05$) and in the expected direction in the two-factor model.

Relationship with senior executives (in the parent firm). To assess the strength of a CV unit's relationship with executives in the parent company, we asked CV unit managers to indicate how frequently members of the unit communicated with¹⁰: (1) the senior executives in the corporate parent to whom the CV unit reported, and (2) other senior executives in the corporate parent. The response format was as follows: 1 = 'never', 2 = 'rarely', 3 = 'monthly', 4 = 'weekly', and 5 = 'daily'. A 'not applicable' response option was also provided. Principal component analysis demonstrated that all items loaded on a single factor, having an eigenvalue of 1.52 and accounting for 76 percent of the variance (Cronbach's alpha = .67).

Relationship with business units. We asked CV unit managers to indicate how frequently they communicated with: (1) "Executives in business units/divisions of the corporate parent"; (2) "Technical/R&D people in the corporate business units/divisions"; and (3) "Front line/middle management in corporate business units/divisions". The response format was as per the relationship with senior executives measure. Principal component analysis demonstrated that all items loaded on a single factor, having an eigenvalue of 2.38 and accounting for 79 percent of the variance. Internal reliability was high (Cronbach's alpha = .87).

Relationship with the venture capital community. We asked CV unit managers to indicate how frequently they communicated with: (1) "partner VC companies" and (2) "other companies or individuals in the VC community". Principal component analysis demonstrated that all items loaded on a single factor, having an eigenvalue of 1.80 and accounting for 90 percent of the variance. Internal reliability was high (Cronbach's alpha = .86).

¹⁰ In constructing these items, we follow in the tradition established by Granovetter (1973, 1995) whereby frequency of interaction between ties is taken as a proxy of the 'strength' of their relationship.

5.3.3 Control Measures

Finally, a number of control measures were utilized in the analyses, also derived from the responses to the mail survey. Single-item measures for the *number of full-time employees* (or equivalent part-time employees) in the CV unit, the *age of the unit* (in years) and the *number of investments* the unit had undertaken, were used to control for possible ‘economies of scale’ and ‘learning curve’ effects on CV units - potentially enabling both the creation of venturing ambidexterity and CV unit survival - as well as for possible ‘markers’ that may signal legitimacy in more established CV units.

Two nominal variables were used to partial out the effects of CV unit industry membership and geographic location from the analyses: with a *hi-tech sector* dummy variable identifying whether or not each parent company’s main line of business was in a high-technology industry, and the dummy variable *region* indicating whether or not the CV unit was headquartered in the United States.

Internal investments captured the relative emphasis placed by a CV unit on internally-generated investments (versus investments in independent start-ups), a key dimension in CV unit typologies (Miles & Covin, 2002; Sharma & Chrisman, 1999). CV unit managers were asked to report on the prevalence of investment by their CV unit in the following types of business opportunities: (1) “We invest in internally-generated business ideas to promote organic growth”; (2) “We invest in internally-generated business ideas with a view to spinning them out as separate businesses”; and (3) “We invest in internally-generated business ideas to leverage under-utilised corporate assets (e.g. intellectual property)”. The response options were (on a scale of 1 to 5): 1 = ‘never’, 2 = ‘only in exceptional cases’, 3 = ‘occasionally’, 4 = ‘frequently’, and 5 = ‘almost always’. Principal component analysis demonstrated that all items loaded on a single factor, having an eigenvalue of 1.97 and accounting for 90 percent of the variance. Internal reliability was acceptable (Cronbach’s alpha = .73).

Similarly, *external investments* measured the relative emphasis placed by a CV unit on investments in independent start-ups. Along the same response format as per the internal investments measure, its three items comprised: (1) “We invest in independent start-ups with a view to learning from them and developing strategic relationships”; (2) “We invest in independent start-ups with a view to increasing demand for our products and services”; and (3)

“We invest in independent start-ups / external business ideas with a view to acquiring them for corporate growth”. All items loaded on a single factor, having an eigenvalue of 1.59 and accounting for 53 percent of the variance (Cronbach’s alpha = .56¹¹).

In addition to the variables already described, we incorporated an additional set of control variables into our tests of Hypothesis 2. Importantly, we attempted to control for the impact of *perceived CV unit performance* on the survival of CV units. Respondents were asked in the survey to assess the performance of their CV unit on performance dimensions identified in the exploratory interviews. CV unit managers rated the performance of their unit against expectations over the past 3 years (or its period of operation, if shorter) on 18 items, reflecting a broad range of objectives. When factor analyzed, we found 4 items to consistently load on a *strategic performance* dimension and 3 items to load on a *financial performance* dimension. Additionally, we produced a multiplicative interactive measure (*strategic X financial performance*), to control for the possibility that CV units might be expected to achieve a mix of both strategic objectives and acceptable levels of financial return.

The 4 items that comprised the strategic performance measure were: (1) “Creation of breakthrough technology for the corporation”; (2) “Investment in disruptive technologies that potentially cannibalize existing technologies”; (3) “Development of strategic relationships with external suppliers/customers/competitors”; and (4) “Source of funding for internal entrepreneurs”. Response options along a 5-point scale were: 1 = ‘below expectation’, 3 = ‘equal to expectation’, and 5 = ‘above expectation’. Principal component analysis demonstrated that all items loaded on a single factor, having an eigenvalue of 2.27 and accounting for 57 percent of the variance. Internal reliability was acceptable (Cronbach’s alpha = .74).

The financial performance measure comprised 3 items along the same response format, namely: (1) “Financial return to the corporation (e.g. IRR)”; (2) “Contribution to top-line growth”; and (3) “Increased valuation of corporate stock”. Principal component analysis demonstrated all items to load on a single factor, having an eigenvalue of 1.43 and accounting for 48 percent of the variance. Internal reliability was acceptable (Cronbach’s alpha = .72).

¹¹ The reliability of this scale is well below the normal acceptable level for independent and dependent variables, but we felt that it would be acceptable as a control variable in the analyses.

Finally, we controlled for *VC employees* (the percentage of employees with a VC background) in case these brought a different ‘VC logic’ to their units (Sahlman, 1990).

5.3.4 Checks for Common Method Bias

As our survey data may be prone to single-source, common method bias (Podsakoff, MacKenzie, Lee & Podsakoff, 2003), we took a number of steps to assure ourselves that such biases did not pose a significant threat to our analyses. Most critically, as mentioned previously, we gathered CV unit survival data as a relatively objective independent outcome measure for our CV units. This data on CV unit survival was collected two years after all other data, so the responses we received were unlikely to be influenced by the earlier round of data collection.

Additionally, we investigated the threat posed by common method variance within the mail survey by subjecting the data to a Harman one-factor test. We conducted principal component analysis on all items making up our six independent and dependent variables. The first factor accounted for only 22 percent of the variance and six factors were necessary to explain 69 percent of the variance. If common method bias were a serious problem in our data, one factor accounting for most of the covariance in the independent and dependent variables should have emerged (Podsakoff et al., 2003).

Furthermore, we collected supplementary archival data from the Venture Economics database to act as a validity check on the investment history data reported by survey respondents. The self-reported portfolio data captured by the survey was highly consistent with Venture Economics data, thus providing us with a fair degree of comfort in the accuracy of the self-reported investment measures. Specifically, both the number of CV unit investments reported by respondents and the proportion of the portfolio experiencing liquidity events reported highly significant correlations ($p = .000$).

5.4 Findings

Means, standard deviations, and correlations among the variables are shown in Table 5-1. This table indicates that, in terms of the antecedents of venturing ambidexterity, none of the separate measures of CV unit relationships with the three constituencies are significantly

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Dependent Variable																		
• CV unit survival ^b	.77	-																
Independent Variables																		
• Use existing capabilities (Exploitation)	1.92	.49	-.05															
• Build new capabilities (Exploration)	2.36	.55	.08	.15														
• Relationship with senior executives	3.43	.75	.21*	.03	.34**													
• Relationship with business units	3.41	.95	.17	.04	.40**	.57**												
• Relationship with venture capital community	3.49	.98	.26*	-.18	.21	-.02	.22*											
Control Variables																		
• Age of unit	4.47	5.20	.05	-.01	.04	-.04	-.09	.00										
• Number of CV unit employees	16.73	38	-.03	.10	.08	.20	.21*	.08	.09									
• VC employees (%)	.17	.27	-.05	-.05	-.11	-.08	-.17	-.09	-.05	-.07								
• Number of investments	40.39	121.5	.14	.03	.05	.18	.18	.22*	.30**	.81**	-.05							
• Hi-tech sector ^c	.51	-	-.09	-.19	-.11	.09	.06	.03	.24*	.15	-.10	.20						
• Region ^d	.54	-	.09	.34**	-.05	-.14	-.08	-.06	-.06	-.07	-.05	-.12	-.16					
• Internal investments	2.19	.97	-.15	.55**	-.06	.10	.01	-.34**	.04	.03	.01	-.06	-.04	.16				
• External investments	2.88	.95	-.08	-.11	.37**	.11	.14	.16	.00	-.01	.12	.00	-.06	-.10				
• Financial reporting line ^e	.15	-	.18	-.24*	.23*	-.04	.06	.26*	-.04	-.06	-.12	-.02	.00	.23*	-.13	-	.19	
• Strategic performance	3.36	.60	.34**	.11	.34**	.09	.14	.40**	.08	-.04	-.07	.14	-.09	.01	.01	.10	.14	
• Financial performance	3.07	.61	.18	.16	.09	-.04	-.01	.18	.22	.11	.01	.23*	.03	.00	.13	.01	.08	.20

Table 5-1 Means, Standard Deviations, and Correlations^a

^a n = 95 (CV units) ^b Dummy variable (1 = surviving unit) ^c Dummy variable (1 = parent company in a hi-tech sector) ^d Dummy variable (1 = unit head-quartered outside of the US) ^e Dummy variable (1 = unit has a financial director reporting line)

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

correlated with exploitation; relationships with parent company executives ($r = .34, p < .01$) and business units ($r = .40, p < .01$) are, however, significantly correlated with exploration. Additionally, although exploration and exploitation are not significantly correlated with CV unit survival, relationships with parent firm executives ($r = .21, p < .05$) and with the VC community ($r = .26, p < .05$) are.

We tested our first hypothesis using ordinary least squares (OLS) regression. Hypothesis 1 posits that CV unit interaction with three important parties (i.e. senior executives and other business units in the corporate parent, as well as members of the VC community) will be positively related to venturing ambidexterity. From Table 5-2, it is evident that the coefficient of the multiplicative interaction in Model 4 (i.e. joint contact with members of the three communities) is indeed positive and significant ($\beta = .98, p = .001$). Adding the variables concerning CV unit relations significantly improves the explanatory power of the models, with the full model accounting for nearly 40 percent of variance in ambidexterity (adjusted $R^2 = .38$). While not hypothesized, the main effects of relationships with parent company executives, other business units and members of the VC community are also positive and significant in the full regression model, indicating that these contribute independently as well as jointly to venturing ambidexterity.

Plotting this three-way interaction graphically facilitates further insight into the nature of the conditional effects of interaction with senior executives, other business units and members of the VC community on venturing ambidexterity. Figures 5-2a and 5-2b display these relationships, representing each of the three variables at one standard deviation from its mean (Aiken & West, 1991; Jaccard & Turrisi, 2003). From a comparison of the charts, it is evident that increases in venturing ambidexterity are associated with greater contact with VCs, senior executives and other business units (refer to the upward-sloping lines in Figure 5-2b). The nature of the conditional relationship is, however, more nuanced than predicted in Hypothesis 1. Where contact with the VC community is low, these relationships are reversed. The downward-sloping solid line in Figure 5-2a indicates that, where CV unit interaction with other business units in the parent company is high, greater contact with senior corporate executives is associated with reduced levels of venturing ambidexterity.

Venturing Ambidexterity												
	Model 1			Model 2			Model 3			Model 4		
Intercept	1.78	(.69)	**	.04	(1.12)		-.67	(3.50)		-36.32	(10.60)	***
<i>Control Variables</i>												
Age of unit	.01	(.03)		.02	(.03)		.01	(.03)		.02	(.03)	
Region	.63	(.31)	*	.65	(.31)	*	.44	(.32)		-.34	(.37)	
Hi-tech sector	-.59	(.31)	+	-.64	(.31)	*	-.53	(.31)	+	-.88	(.30)	**
Number of CV unit employees	.01	(.01)		.01	(.01)		.01	(.01)		-.01	(.01)	
Number of investments	.00	(.00)		-.00	(.00)		-.00	(.00)		.00	(.00)	
Internal investments	.59	(.16)	***	.61	(.16)	***	.66	(.16)	***	.77	(.15)	***
External investments	.29	(.16)	+	.22	(.16)		.17	(.17)		.15	(.16)	
<i>Relational Context</i>												
Relationship with senior executives				.12	(.25)		-.98	(1.13)		8.14	(2.79)	**
Relationship with business units				.30	(.20)		2.83	(1.24)	*	17.81	(4.40)	***
Relationship with VC community				.14	(.17)		-.62	(.71)		8.58	(2.69)	**
Relationship with senior executives X relationship with business units							-.34	(.20)	+	-4.07	(1.07)	***
Relationship with senior executives X relationship with VC community							.64	(.29)	*	-1.73	(.72)	*
Relationship with business units X relationship with VC community							-.40	(.24)		-4.26	(1.11)	***
Relationship with senior executives X relationship with business units X relationship with VC community										.98	(.28)	***
R ² Change	.28		***	.06			.06		+	.09		***
F-Value	4.330		***	3.778		***	3.565		***	4.730		***
Adjusted R ²	.22			.25			.28			.38		
R ²	.28			.34			.39			.48		

Table 5-2 OLS Regression of Venturing Ambidexterity on Relational Context

n (pairwise deletion) = 95. Unstandardized regression coefficients reported. Standard errors in parentheses. All tests are two-tailed.

*** p<.001 ** p<.01 * p<.05 + p<.10

Thus, the conditions for high venturing ambidexterity differ for scenarios of high versus low involvement with the VC community: where CV units have low VC contact, the highest ambidexterity levels are associated with high involvement with other business units and low involvement with senior executives; while where CV units have high VC contact, the highest ambidexterity levels are associated with high involvement with both executives and other business units in the parent company. Overall then, the analysis suggests a somewhat more complex interaction effect than that predicted in Hypothesis 1, a point we return to in the discussion.

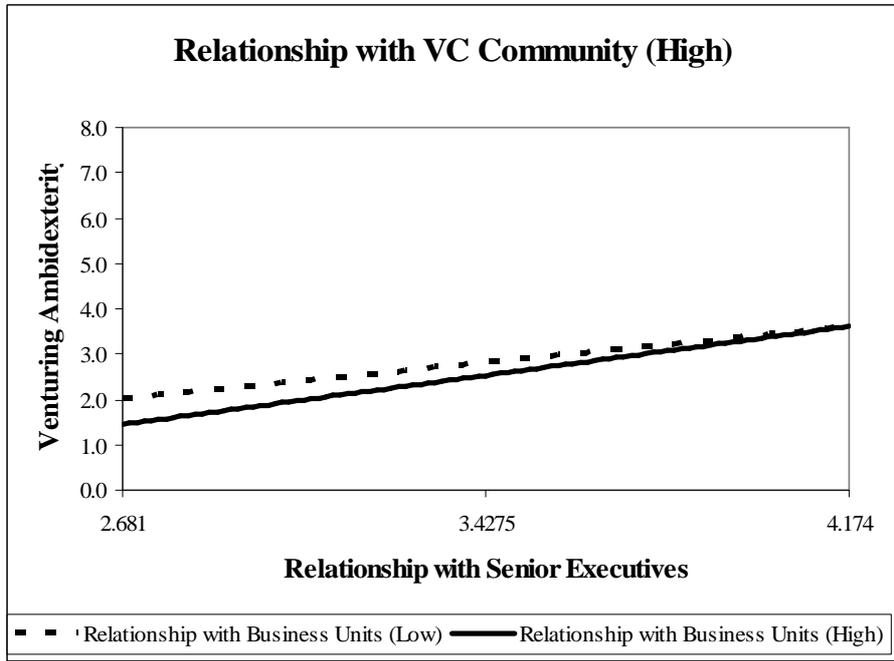
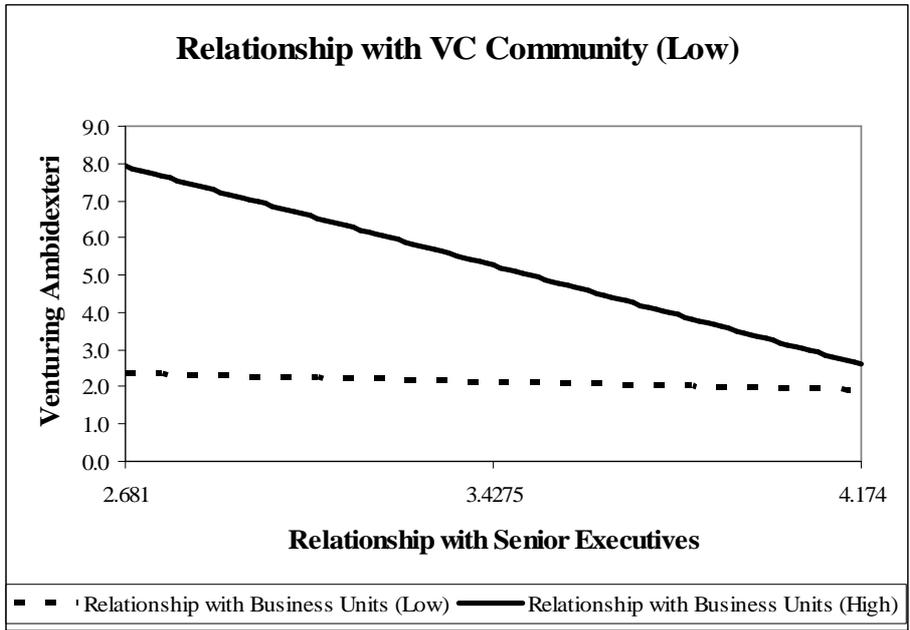


Figure 5-2 Three-Way Interaction Effects on Venturing Ambidexterity

Hypothesis 2 predicts that venturing ambidexterity (i.e. the multiplicative interaction between using existing capabilities and building new capabilities) will be positively associated with CV unit survival. We tested this second hypothesis using binary logistic regression. Table 5-3 shows the results of this analysis, indicating enhanced explanatory power once the venturing ambidexterity interaction term is incorporated into the full model (viz. the pseudo- R^2 value increases from .28 to .34 between Models 2 and 3).

	CV Unit Survival					
	Model 1		Model 2		Model 3	
Intercept	-8.23	(7.27)	-9.05	(1.28)	5.50	(9.10)
<i>Control Variables</i>						
Region	.78	(.63)	1.02	(.69)	1.40	(.78) +
Hi-tech sector	-.46	(.62)	-.52	(.63)	-.29	(.67)
Number of CV unit employees	-.05	(.03)	-.04	(.03)	-.07	(.04) +
Number of investments	.03	(.02)	.04	(.02)	.05	(.03) *
Internal investments	-.24	(.31)	-.09	(.36)	-.06	(.37)
External investments	-.34	(.34)	-.31	(.36)	-.58	(.41)
VC employees	-.21	(1.03)	-.26	(1.04)	-.68	(1.11)
Financial reporting line	1.58	(1.26)	1.58	(1.28)	2.06	(1.35)
Strategic performance	2.97	(2.05)	3.37	(2.18)	3.97	(2.14) +
Financial performance	2.26	(2.28)	2.68	(2.37)	3.14	(2.37)
Strategic X financial performance	-.59	(.65)	-.70	(.67)	-.76	(.66)
<i>Venturing Ambidexterity</i>						
Build new capabilities			.06	(.74)	+	-7.09 (3.22) *
Use existing capabilities			-.76	(.85)	-	(4.74) *
					11.42	
Use existing capabilities X build new capabilities (i.e. venturing ambidexterity)					4.58	(2.00) *
Wald test (prob. > χ^2)	28.20(11)	**	29.02(13)	**	34.40(14)	***
Log likelihood	-37.31		-36.90		-33.71	
Pseudo R^2	.27		.28		.34	

Table 5-3 Logistic Regression of CV Unit Survival on Venturing Ambidexterity

^a n = 95. Mean replacement of missing values necessitated by Stata inteff function (Ai & Norton, 2003; Norton, Wang, and Ai., 2004) Unstandardized regression coefficients reported. Standard errors in parentheses. All tests are two-tailed.

*** p<.001 ** p<.01 * p<.05 + p<.10

In support of Hypothesis 2, the venturing ambidexterity coefficient in Model 3 is indeed positively and significantly ($\beta = 4.98$, $p < .05$) associated with CV unit survival. Specifically, the odds of a CV unit surviving to 2003 more than doubled, increasing by 145.47 percent (i.e. the exponent of $\beta = 4.98$), for every one unit increase in its ambidexterity score. As an additional check, as the direct interpretation of interaction terms in logistic regression may be problematic, we used Norton and colleagues' (Ai & Norton, 2003; Norton et al., 2004) Stata inteff program to compute the cross partial derivative of the expected value of y (that is, CV unit survival) to

assess the marginal effects of the venturing ambidexterity interaction on unit survival. The results were consistent with those from the logistic regression analysis, that is: the interaction effect was positive and significant across all values of y (venturing ambidexterity), with the exception of a handful of extreme values on either end. In other words, the combination of building new and using existing capabilities facilitates CV unit survival, especially in those units with middling chances of survival.

Additionally, we tested to see whether ambidexterity mediated the relationships between a CV unit's relational context and its likelihood of survival. While not hypothesized, the structure of the model may suggest a mediation logic, which we sought to check. Following Baron and Kenny (1986), a series of regression analyses were performed to test for mediation between these variables. The requirements of the first (fundamental) step of Baron and Kenny's (1986) 4-step procedure failed, however, to be met: the initial variable (the relational context 3-way interaction measure) was not significantly correlated with the outcome variable (CV unit survival) in the binary logistic regression analysis ($p > .10$)¹. Consequently, we can conclude that there is not a significant relationship between relational context and CV unit survival to potentially be mediated by venturing ambidexterity.

5.5 Discussion and Conclusions

Two important findings emerge from this research. First, ambidextrous CV units are characterized by high levels of interaction between the CV unit managers and *three* sets of actors – senior executives in the parent company, other business units in the parent company, and members of the VC community. Rather than focusing on one of these groups ahead of others, the more ambidextrous CV units devote attention to developing strong relationships all three. However, we also encountered a surprising finding, namely that those CV units with high levels of independence from both senior executives and members of the VC community, but showing high involvement with business units, also rated high on ambidexterity.

¹ Although Pearson tests show a significant correlation between relational context (i.e. the 3-way interaction effect measure) and CV unit survival ($r = .25, p = .02$), this fails to be significant once controlling for the associated main and 2-way effects of relationships with executives, other business units and VCs, and for the control variables incorporated into the analyses shown in Tables 2 and 3.

Second, survival was more likely in those CV units that rated high on using existing corporate capabilities *and* building new corporate capabilities. Or stated slightly differently, surviving CV units exhibit ambidexterity – the capacity for exploitation and exploration at the same time. This finding is consistent with the expectations of ambidexterity theorists (Duncan, 1976; Gibson & Birkinshaw, 2004; He & Wong, 2004; Lubatkin et al., 2006; Tushman & O’Reilly, 1996), but it is the first time it has been demonstrated in the corporate venturing context. Moreover, we open up the possibility that CV unit survival might be attributed rather to the legitimating effects of ambidexterity than to the actual improvements in performance that ambidexterity brings.

It is useful to consider the implications of all these findings in the light of related studies as they offer some interesting implications for theory and for practice.

5.5.1 Relational Context and Ambidexterity

The first set of implications relates to the link between relational context and ambidexterity in corporate venturing. While it is now standard practice in other areas of organization research to characterize informal organizations in terms of individual networks (e.g. Burt, 1992; Granovetter, 1973, 1985), there has been, until recently, very little attention paid to such approaches in corporate venturing research (cf. Wilson, Maula, & Keil, 2004). Instead, researchers have preferred to focus on traditional structural measures such as the lines of reporting between the CV unit and the parent company, or the level of operating autonomy of the CV unit (e.g. Galbraith, 1982; Siegel et al., 1988; Sykes, 1986). One potential contribution of this study, then, in examining the relational context of the CV unit, is to reorient corporate venturing research towards a richer characterization of the context in which it operates.

Similarly, the prevailing perspective within the ambidexterity literature emphasizes formal, structural mechanisms through which exploration and exploitation may be managed within organizations (Duncan, 1976; O’Reilly & Tushman, 2004; Smith & Tushman, 2005; Tushman & O’Reilly, 1996). Of necessity, given that CV units are by definition organizationally distinct units, structural antecedents are not relevant to cultivating venturing ambidexterity. Rather, this study suggests that the informal, relational context of CV units may provide a platform through which ambidexterity may be attained by CV units. This approach finds

resonance with recent work suggesting that ambidexterity may indeed be feasible within single business units (Gibson & Birkinshaw, 2004; Jansen et al., 2006).

In terms of the practical implications regarding the association between relational context and ambidexterity, we observe two distinct paths through which ambidexterity may be reached. One involves engagement by CV units with all three constituencies examined here - parent company executives and members of other business units, and members of the VC community. The other route towards ambidexterity, where CV units have little engagement with the VC community, involves autonomy from senior executives. Many authors have indeed advocated high autonomy from the corporate parent (e.g. Galbraith, 1982; Siegel et al., 1988), given the previously mentioned challenges that relationships with internal constituencies may entail. The finding of a second pathway to ambidexterity suggests that building strong relationships across these organizational interfaces may not always be advantageous to corporate venturing units.

Further research is required into the conditions under which each of the alternative routes is preferable. One factor that may, for example, influence the viability of the alternatives may be the resource richness of the CV unit itself. Those units that possess internally many of the resources they would otherwise need to broker from other parties may choose the more autonomous route to ambidexterity. The length of venturing experience, and the presence of strong venture champions that have effectively cultivated appropriate strategic and structural contexts (Burgelman, 1983, 1985) for CV units may also enable units to pursue the more autonomous route to ambidexterity. Conversely, high autonomy from the parent corporation may present a necessary survival tactic where the parent presents especially extreme obstacles to a CV unit achieving success. Extreme frustration with corporate 'interference' certainly appears widespread (Siegel et al., 1988) and may necessitate minimal engagement at times.

Additionally, it is likely that venturing ambidexterity and the levels of engagement of a CV unit with key internal and external constituencies are reciprocal. Engaging with executives, other business units and venture capitalists enables CV units to broker the tangible and intangible resources (including legitimacy) they need to operate ambidextrously, while acting ambidextrously may, in turn, facilitate stronger relationships between CV units and their key internal and external constituencies.

Legitimacy functions as a crucial determinant of resource acquisition by organizations, particularly in conditions where their performance in terms of material goals is difficult to assess (Aldrich & Fiol, 1994; Meyer & Zucker, 1989; Suchman, 1995). Venturing ambidexterity, through acting as a legitimating device (Lounsbury & Glynn, 2001), may hence enable greater access to resources from a CV unit's constituencies. Unfortunately, given the nature of our data on CV unit relational context and ambidexterity, we were unable to test for reciprocity in the relationships between these constructs. We encourage longitudinal research that may seek to understand potential feedback cycles at play between venturing ambidexterity, its relational antecedents and legitimacy in the eyes of venturing constituencies.

5.3.2 Venturing Ambidexterity and Survival

The second set of implications of the study relates to the link between ambidexterity and the survival of CV units in the parent firm. Departing from the prevailing functionalist perspective that focuses on long-term performance benefits accruing to ambidextrous organizations, we develop an alternative perspective that draws on institutional theories and emphasizes the social and symbolic advantages of ambidexterity to corporate venturing. We contend, that – aside from any performance advantages that ambidexterity may generate – an ambidextrous identity facilitates CV unit legitimacy with key constituencies and thereby enhances a unit's chances of survival within its parent firm. The evidence provides tentative support for this proposition.

Ambidexterity indeed embodies many of the essential properties of an effective legitimating device, as described in institutional literatures on nascent industries. Specifically, it “makes the unfamiliar ... more familiar” (Lounsbury & Glynn, 2001: 550) by speaking to the established identities of key constituencies in a language which indicates a common bond, thereby enabling comprehension and acceptance. Simultaneously, ambidexterity provides sufficient latitude for CV units to pursue exploratory activities that depart from those of the parent firm (Aldrich & Fiol, 1994, Dougherty, 1995). Overall, it represents a creative combination of conformity and adaptation to the institutional pressures presented by CV units' internal and external constituencies (Kraatz & Zajac, 1996; Oliver, 1991).

Gaining legitimacy in CV units provides an interesting case study too for institutional theory as it represents a context in which internal constituencies have direct power over decisions

regarding survival. Hence, internal actors become key constituencies for the cultivation of cognitive and social legitimacy, in addition to any efforts by CV units to gain legitimacy in the eyes of influential external stakeholders. This is a neglected topic in institutional literature which has focused largely on gaining legitimacy from external constituencies (Bridwell-Mitchell & Mezias, 2006).

The general applicability of ambidexterity as a survival-enhancing legitimating device to other units within large organizations needs testing in other contexts. Our tentative expectation is that we might observe similar findings in other types of organizational hybrids, such as joint ventures or alliances (Borys & Jemison, 1989), given their reliance on linkages to multiple independent actors for their survival, rather than a single hierarchical line of authority.

Our findings on the benefits of an ambidextrous approach to capabilities appear too to resonate with studies indicating that CV units may function best when they invest in ventures that are moderately related to the existing business of the parent firm (e.g. Burgelman, 1985; Gompers & Lerner, 1988; Sykes, 1986). This may suggest an important boundary condition to our theory which we are unable to interrogate here – that an ambidextrous approach to capabilities may enhance CV unit strategic performance where moderately related ventures are pursued. Future studies may wish to examine the relationships between the relatedness of investments, positions on the exploration-exploitation dichotomy, and the performance and viability of CV units.

5.5.3 Conclusions

The intention of this chapter was to explore ambidexterity as a means through which the vulnerable activity of corporate venturing may come to garner support and increase its life-chances. We developed a novel conceptualization of the CV unit by building on March's (1991) distinction between processes of exploration and exploitation in organizational learning, and by integrating this approach with recent advances in thinking about organizational ambidexterity. Our research suggests two conclusions: that combined attention to actors inside and outside the boundaries of the firm enables the CV unit to simultaneously make use of existing capabilities while also building new ones; and that through this ambidextrous or dualistic focus, the CV unit is better able to legitimate its activities such that it enhances its odds of having an ongoing role as part of the parent firm. In examining how ambidexterity is cultivated within the CV unit's

relational context, and the implications of ambidexterity for a unit's survival, we contribute to the literatures on corporate venturing, ambidexterity and organizational legitimacy.

CHAPTER VI

CONCLUSION

6.1 Overall Contributions of the Dissertation

The principal contributions of the dissertation to theory, research methods and practice are summarised in Table 6-1.

Although both the studies reported in the dissertation make contributions to a number of literatures (see Section 1.4 'Major Concepts and Theoretical Perspectives' for a review of the primary literatures that have informed our approach to each research domain), we focus in this chapter on contributions to the major body of literature each study addresses. Hence, we focus on the contribution of Study 1 (i.e. Chapters 2 and 3) to the intersection of entrepreneurial opportunity recognition and CE literatures. We then examine the contribution of Study 2 (i.e. Chapters 4 and 5) to corporate venturing literature, as a component of CE literature. We highlight the contributions of the studies (and each associated chapter) to theory, research methods and practice in turn. We conclude each section with a discussion the major limitations of each study and highlight extensions and further research that may prove beneficial to each research domain. As both our research domains are embryonic at present, opportunities for future research are enormously bountiful. We hence touch on only a small number of ideas for future research that are closely associated with the topics and perspectives explored in the dissertation.

It warrants mention here too that the two studies reported in the dissertation were conducted as distinct research enquiries. It was beyond their remit to integrate the topics of dispersed idea generation and focused corporate venturing activities. This does not suggest, however, that their combination would not be an avenue for potentially fruitful investigation. By way of illustration, little is currently known regarding patterns of 'flow' of ideas to venture units. Indeed, few studies (with the notable exception of the influential work of Burgelman, 1984, 1985, 1991) have attempted to address the broader question of what happens to ideas generated by members of an organization, where these are articulated internally by the member. This is a topic which appears, judging by presentations at recent

	Major Findings	Contribution to Theory	Contribution to Methods	Contribution to Practice
Idea Generation via Dispersed CE (Ch. 2 & 3)	<p><i>Idea Set Construct:</i></p> <ul style="list-style-type: none"> Individuals' idea sets can be meaningfully differentiated along dimensions of content, volume, value logic, stage of development, novelty and composite knowledge configurations. <p><i>Antecedents of Idea Set Novelty and Volume:</i></p> <ul style="list-style-type: none"> Regarding knowledge-based and contextual antecedents, knowledge breadth was associated more with idea set volume, whilst exposure to broad and deep stimuli were more related to idea set novelty. No significant differences were found for deep knowledge. Different knowledge processes help account for idea set novelty and volume. Novelty appears to involve knowledge transformation processes; volume, to involve knowledge combination processes. 	<ul style="list-style-type: none"> Proposing 'idea sets' as a more comprehensive, dimensionalized unit of analysis for examining opportunity recognition in firms. Demonstrating the utility of a knowledge-based and information processing perspective to understanding individual, contextual and process factors that differentially affect idea set novelty and volume. 	<ul style="list-style-type: none"> Developing a field instrument to measure idea set dimensions. Collection of a unique multi-phase dataset that combinations measures relating to individual knowledge, contextual stimuli, knowledge processes and idea sets. 	<ul style="list-style-type: none"> The findings suggest that organizations may wish to give more attention to the profile of entrepreneurial ideas they wish to generate via dispersed means, and accordingly to creating suitable stocks of knowledge and contextual exposure amongst their knowledge workers.
Focused CE via CV Units (Ch. 4 & 5)	<p><i>CV Unit Configurations:</i></p> <ul style="list-style-type: none"> The strategic and organizational profiles of different CV unit types show a moderate degree of convergence. The greater the fit between elements of a CV unit's organizational profile, the better its performance (along financial, technological and entrepreneurial dimensions). Different types of CV units exhibit different survival rates, with exploitation-oriented units having higher survival rates than exploration-oriented units. <p><i>Ambidexterity of CV Units:</i></p> <ul style="list-style-type: none"> More ambidextrous CV units exhibit either: (a) strong engagement with senior executives and other business units in their parent company, and with the VC community; or (b) strong engagement with only other business units in their parent company. The more ambidextrous a CV unit, the greater its likelihood of survival. 	<ul style="list-style-type: none"> Configurational theory can usefully be applied to understanding different types of CV units, their associated strategic and organizational characteristics, and their survival and (especially) performance. Recognising both exploitative and explorative dimensions of CV unit roles contributes to a better understanding of their performance and survival. Furthermore, the simultaneity of the two (i.e. CV unit ambidexterity) may enhance the legitimacy and, thereby, odds of survival of CV units. 	<ul style="list-style-type: none"> Collection of a unique multi-phase and multi-source dataset that includes both internally- and externally-oriented CV units. Application of configurational analysis techniques to understanding different types of CV units, their associated strategic and organizational characteristics, and their survival and (especially) performance patterns. 	<ul style="list-style-type: none"> The configurational findings suggest the importance of ensuring the alignment of internal CV unit elements for performance. The findings regarding exploration and exploitation in CV units suggest: (a) perceptual biases in organizations that privilege the survival of exploitation-oriented CV units, and (b) a legitimating role for ambidexterity in CV unit survival. Both suggest managerial implications for capability development and impression management.

Table 6-1 Contributions of the Dissertation to Theory, Methods and Practice

conferences (e.g. Czernich, 2003, 2004; De Clerq, Castaner, & Belausteguigoita, 2006; Ren & Guo, 2007), to be generating current research interest. The focus of all the works cited, however, is centred on the degree of, and means through which, ideas may gain organizational approval. The divergent structural mechanisms through which ideas with different characteristics may be pursued by organizations remains (to the best of our knowledge)⁵⁹ unexplored. This is an area of both theoretical and practical relevance that would benefit from further research.

6.2 Idea Generation via Dispersed CE

6.2.1 Key Contributions

Study 1 (Chapters 2 and 3) addressed the under-explored domain of dispersed opportunity recognition in large, established firms. Most fundamentally, this study (and its associated chapters) make contributions of a theoretical, methodological and practical nature to literature on opportunity recognition, corporate entrepreneurship, and their intersection. In addition, the findings of Chapters 2 and 3 have implications for the base literatures on technological search and organizational creativity that also inform our approach to this research domain. The latter implications have been outlined within the chapters themselves. Rather, we emphasize here the contributions to corporate opportunity recognition theory, research methods and practice. In particular we examine contributions to advancing knowledge along the two research questions that guided our efforts in this domain. That is:

- (1) Along which dimensions may opportunities recognized by corporate knowledge workers meaningfully be differentiated?
- (2) How do individual knowledge and contextual stimuli influence the nature of entrepreneurial opportunities recognized by corporate knowledge workers?

Contribution to Theory: There are two major contributions of Study 1 to the neglected intersection of CE and entrepreneurial opportunity recognition topics. The first contribution is developing and dimensionalizing our new ‘idea set’ unit of analysis for

⁵⁹ Burgelman (1984) presents, however, some interesting normative propositions regarding structural mechanisms through which initiatives may be pursued by firms. He differentiates initiatives along two dimensions in this paper, namely: (1) their strategic importance for, and (2) their operational relatedness to the parent company. Alternative organizational mechanisms are then proposed to be best suited for each cell in the 2X2 matrix. These normative propositions could be used as a starting point for developing theory into where ideas may flow in organizations.

corporate opportunity recognition. This conceptual device seeks to advance inquiry on the first question outlined above, viz. along which dimensions may opportunities recognized by corporate knowledge workers meaningfully be differentiated? The second contribution to theory is developing and testing a set of knowledge-based and information processing hypotheses regarding differences in the antecedents of idea set novelty and volume. This endeavour is targeted at better addressing the second question outlined above, viz. how do individual knowledge and contextual stimuli influence the nature of entrepreneurial opportunities recognized by corporate knowledge workers?

Regarding the *idea set unit of analysis*, we contend that this construct embodies a number of significant advances for theorizing corporate opportunity recognition over the prevailing ‘single opportunity’ orientation in opportunity recognition literature (cf. Dimov, 2004; Gaglio, 2004). Critically, an idea set unit of analysis enables a far more comprehensive and detailed perspective to be taken on the ventures or initiatives an individual may be thinking about at any given time, and how these may change over time. Considering the complete set (March & Simon, 1958) of entrepreneurial ideas accessible with memory provides a more rigorous basis for theory development (as well as empirical research, a point we return to in the following section) on: (a) the antecedents of ideas generated, and (b) factors affecting their fates over time. In these respects, the idea set unit of analysis provides a critical ‘bridge’ between antecedents and corporate entrepreneurial behavior, illuminating what was previously something of a ‘black box’ in entrepreneurship (and CE) literature.

In particular, our conceptualization of the idea set construct helps overcome a number of limitations of extant opportunity recognition research. These are discussed at length in Sections 1.4.1 and 2.2, and include:

- (1) very limited differentiation of opportunities along key characteristics (cf. Ardichvili, Cardozo, & Ray, 2003, and Sarasvathy, Velamuri, Dew, & Venkataraman, 2003, for exceptions);
- (2) sample selection biases towards investigating only exploited opportunities via the dominant utilisation of business founding as a proxy for opportunity recognition (Corbett, 2007; Davidsson & Honig, 2003; Dimov & Shepherd, 2005; McMullen & Shepherd, 2006), and associated problems of retrospective and survival biases influencing findings; or, alternatively,

- (3) the limited ability to address contextual antecedents of opportunity recognition where quasi-experimental methods are used to tap opportunity recognition (e.g. Corbett, 2007; Dimov, 2007a; Shepherd & De Tienne, 2005); and
- (4) lack of adaptation of the entrepreneurial opportunity construct to the corporate context (Dimov, 2004), for example in terms of the content and value logics of opportunities.

All these limitations critically hinder the advancement of knowledge, especially in the corporate context, regarding what has come to be seen as a defining concern of entrepreneurship – i.e. “Why do some people and not others discover particular entrepreneurial opportunities?” (Shane & Venkataraman, 2000: 221).

Regarding our development of theoretical propositions on the *antecedents of idea set novelty and volume*, Chapter 3 (uniquely we believe) demonstrates the utility of a knowledge-based and information processing perspective (Ocasio, 1997; March & Simon, 1958; Simon, 1947, 1979, 1997) to understanding individual, contextual and process factors that differentially affect idea set novelty and volume. In addition to illustrating the utility of the idea set unit of analysis, this chapter extends knowledge on the impact of a broader range of individual knowledge and contextual stimuli on opportunity characteristics than has been investigated to date.

Importantly for theory development, it suggests that opportunities differ along meaningful dimensions other than economic magnitude (Åstebro & Gerchak, 2001), and that the origins of such characteristics may exhibit systematic differences. In this regard, we found a number of distinctive antecedents to account for the novelty and volume of entrepreneurial ideas generated by corporate knowledge workers. In particular, we found that possessing a broad knowledge base was associated more with the volume of ideas generated than with their novelty, whilst exposure to broad and deep stimuli were both more strongly related to the novelty of ideas. Furthermore, different knowledge processes help account for idea set novelty and volume. In this regard, idea set novelty appears to involve cognitive processes of knowledge transformation (Koestler, 1942; Mumford & Gustafson, 1988), triggered by equivocal thought processes associated with diverse contextual stimuli. Idea set volume, to the contrary, while still facilitated by broad exposure to stimuli, was not triggered by equivocality and was rather explained by knowledge combination (Fleming, 2001; Katila & Ahuja, 2002; Nelson & Winter, 1982; Schumpeter, 1934) processes.

In all, these findings highlight the value of integrating and extending the constructs and propositions of extant literature streams in order to facilitate new understandings of corporate idea generation. For opportunity recognition literature in particular, the findings suggest that considering multiple opportunity dimensions, a broader range of knowledge variables, and (as a critically neglected area in opportunity research; Dimov, 2004, 2007b) contextual factors, can help the field to develop a more comprehensive and fine-grained theory of the (subjectivist) origins of entrepreneurial ideas. On the latter point of incorporating context into accounts of opportunity recognition, our findings suggest that a Carnegie search or information processing perspective may be elucidating, alongside very recent efforts to examine the impact of informal social networks on entrepreneurial ideas (e.g. Arenius & De Clerq, 2005; Ozgen & Baron, 2007).

Contribution to Methods: Empirical methods to measure entrepreneurial opportunities are probably still in their infancy, accompanying the recent surge of interest in this topic (Corbett, 2007; Dimov, 2004; Ireland & Webb, 2007). These methods have a very tricky phenomenon to try to capture – definitional inconsistencies and ambiguities notwithstanding (McMullen & Shepherd, 2006), cognitive phenomenon are invariably difficult to measure, especially those of a strongly intra-personal nature. Hence, any method is likely to be controversial and to provide only partial clues to the underlying nature of its subject.

Study 1 makes two key contributions to empirical research methods on corporate opportunity recognition. These are integrally connected with the conceptual contributions described above. The first key contribution to research methods is our empirical operationalization of an idea set unit of analysis. The idea set measures indeed showed fair evidence of both divergent and convergent validity, and our field work suggested they get much closer to the nature of corporate entrepreneurial ideas than do the received theory on opportunities or the dominant methods used to measure entrepreneurial opportunities in independent settings. In addition, our empirical analyses in Chapter 3 indicated their practical utility in enabling discrimination between sets of antecedents of different idea set dimensions (viz. idea set novelty and volume). While future work may indeed suggest refinements or amendments to our idea set dimensions and measures, we hope that the instrument we have developed and tested here represents a useful advancement at this point in operationalizing this challenging phenomenon.

The second key contribution to research methods is our unique dataset. Our primary survey data from 388 knowledge workers in three large multinational companies, supplemented by in-depth interviews and validated against supervisory assessments, allows us to jointly examine multiple features of individuals' idea sets. Furthermore, it enables us to examine a more comprehensive set of individual knowledge, contextual stimuli and cognitive process antecedents to idea generation than has occurred to date. In turn, a more rigorous analysis of the key topic of individual and contextual antecedents to corporate opportunity recognition has been possible in this dissertation.

Contribution to Practice: A number of practical implications flow too from these findings. A key implication concerns the need for organizations to be more sensitive to differing dimensions of employee ideas, as well as to both commonalities and differences in their antecedents. Specifically, the findings suggest that corporations may wish to create somewhat different conditions depending on the relative balance they wish to achieve between generating many versus highly novel ideas (Mumford & Gustafson, 1988).

Enabling organizational members to be exposed to a broad range of stimuli is a clear and consistent priority should firms wish to enable idea generation, irrespective of the particular form they wish to encourage. We believe this is unlikely to be regarded as a priority at present by many companies, except perhaps for 'high-fliers' the company has identified for fast-track development. Our findings suggest, however, that cultivating a suitable informational environment for idea generation is something that may merit conscious consideration by firms across their cadres of knowledge workers. A variety of human resource policies, communication systems and processes may help effect such environments, together with flexible organizational structures and job designs (Kanter, 1988; Shalley & Gilson, 2004).

However, in addition to providing a broad informational environment, firms that wish to generate highly novel ideas should also focus on providing opportunities for professional engagement - such as developing strong functional communities of practice, providing opportunities to attend external professional events, and perhaps encouraging employee sabbaticals. Furthermore, creating comfort with equivocality amongst organizational members appears important to generating highly novel ideas: potentially posing a considerable challenge indeed to many risk-averse firms. In addition, organizations may wish to consider recruitment and training strategies most suited to the profile of entrepreneurial ideas required by the organization. For example, through gearing recruitment

and training more strongly towards increasing the breadth of individual knowledge profiles where a high volume of ideas, as opposed to highly novel ideas, is desired.

As a general matter, this study suggests a shift in emphasis for organizations, from the typical reliance of large, established firms on focused ‘exploratory’ units (such as R&D laboratories) to recognizing knowledge workers, in broad, as a meaningful source of new ideas (Birkinshaw, 1997). While we do not suggest that companies should abandon their focused innovative efforts, we suggest that more attention be given to enabling a more balanced, and complementary, approach to idea innovation, utilising both dispersed and focused CE strategies.

6.2.2 Major Limitations and Suggestions for Future Research

Studying any form of innovation in organizations presents considerable methodological challenges. Even more so, attempting to study even earlier stages of innovation in the form of new business ideas. Consequently, while we attempted to overcome as many methodological hurdles as we possibly could in designing and conducting Study 1, a number of limitations clearly remain. We will focus on three of the limitations that we consider most serious.

The first limitation relates to the primarily self-reported nature of our data. Given the intra-personal nature of the cognitive antecedents, processes and outcomes examined, we felt that a self-report methodology was largely unavoidable. We recognize, however, that self-reports pose problems, including those related to common method variance, consistency motifs, and social desirability influences (Podsakoff & Organ, 1986). We consequently sought to validate many of the idea set variables against supervisory assessments, although recognizing that one would not necessarily expect strong correspondence between the views of respondents and others, given the nature of the phenomenon under investigation. We would suggest that future studies try also to incorporate multi-source assessments (for example, from peers and reportees), even if only to confirm whether consistent biases exist in the perceptions of different stakeholders regarding features of idea generation. Additionally, multi-method approaches to assessing idea sets and their measures may prove helpful to further construct refinement as well as to further investigating their convergent and divergent validity.

The second limitation relates to the cross-sectional nature of the survey data. This is problematic for inferring causality from the data and for being able to draw meaningful

conclusions regarding temporal features of idea generation. We have attempted to overcome these limitations through conducting longitudinal case studies (not reported here) examining idea generation in a diverse set of 22 individuals from two of the participating companies, which will be the subject of future papers from this research project. Even so, we would encourage more longitudinal studies into corporate idea generation as temporal variables are neglected in all the literature streams we reviewed. A very real problem persists in even longitudinal studies though: attempting to record ideas only fleetingly considered. We believe that our methodology has helped reduce the left-censoring found in studies of commercialized innovations or patented inventions, but we cannot claim comprehensiveness in this respect. In addition, the appropriateness of the six month period we used for our idea set dependent variables in the questionnaire component of the study, while based on temporal periods suggested by our pilot research, needs further testing. Research techniques such as the daily diaries used in Amabile et al's (2005) study into the relationship between affect and creativity may prove highly promising in the future, although whether such intense access to organizations is achievable by many researchers appears questionable.

The third limitation pertains to our exclusive focus on an individual level of analysis. We deemed this necessary given that little is currently known about the antecedents, processes and outcomes at this level, which seems to us to present an essential foundation for building multi-level theories of corporate idea generation. Hence, we would strongly encourage future research to investigate factors that impact corporate idea generation at team, business unit, and organizational levels. From the limited attempts to develop theories of organizational level creativity, it is evident however that careful attention will need to be paid to the extent to which lower level findings can be extrapolated to higher organizational levels (see Ford, 1996, and Woodman, Sawyer, & Griffin, 1993). Investigations at more aggregate levels of analysis (including, perhaps national or regional levels) may also wish to investigate the effects of social identity dynamics on idea generation. While social identity (including culture) clearly impacts individual cognitive processes (Cerulo, 2002; Ross, 2004), and a number of recent studies indicate differences in levels of entrepreneurial aspirations and business start-ups across geographic regions (e.g. Beugelsdijk & Nooderhaven, 2004; Freytag & Thurik, 2007), the impact of national differences on entrepreneurial idea generation has been subject to limited research to date (cf. Baughn et al., 2004).

6.3 Focused CE via Corporate Venture Units

6.3.1 Key Contributions

Study 2 (Chapters 4 and 5) addressed the under-explored domain of focused CE via CV units. Most fundamentally, this study (and these chapters) make contributions of a theoretical, methodological and practical nature to work on corporate venturing, as a component of CE literature. In addition, they have implications for the base literatures on organizational configurations, and exploration, exploitation and ambidexterity, that inform our approach to this research domain. The latter implications have been outlined within the chapters themselves. Rather, we emphasize here the contributions to corporate venturing theory, research methods and practice.

Contribution to Theory: We view the principal contribution of Study 2 (Chapters 4 and 5) to corporate venturing theory as two-fold. First, the analyses in Chapter 4 suggest that configurational theory may usefully be applied to understanding different types of CV units, their associated strategic and organizational characteristics, and their survival and (especially) performance patterns. Second, we contend that both Chapters 4 and 5 demonstrate that recognising both exploitative (i.e. using parent company capabilities) and explorative (i.e. building capabilities for the parent company) dimensions of CV unit roles and operations - and the simultaneity of the two (i.e. CV unit ambidexterity) - can contribute to a better understanding of their performance and survival. Hence, overall, our application of these particular theoretical perspectives to CV units sheds new light on the research question posed for this research domain, namely: which processes, systems and structures are associated with superior (a) CV unit performance, and (b) CV unit survival? Critically too, such additional insights are facilitated through the application of well-established theories to what has tended to date to be a fairly atheoretical domain.

Regarding our application of *configurational theory and logic* (cf. Doty, Glick, & Huber, 1993; Fiss, 2007; Meyer, Tsui, & Hinings, 1993; Miller, 1986, 1996) to CV units, it appears that this perspective may usefully contribute to developing a more theoretically grounded and accurate understanding of CV unit ‘types’. While a multitude of corporate venturing objectives have been identified in the past, and a number of two-by-two classifications advocated for CV units (e.g. Burgelman, 1984; Chesbrough, 2002; Miles & Covin, 2002), existing literature has applied a contingency logic to identifying CV unit types. This, we contend, under-represents the complexity of such units. In particular, the benefits of

configurational over contingency approaches to organizational analysis lie in its more realistic conceptualisation of complex interactions and reciprocal causality between organizational characteristics (Ketchen et al., 1997).

The findings portrayed in Chapter 4, although modest at times as may perhaps be expected from an early application of configurational theory and methods to this new domain, tend to confirm the value of a configurational understanding of CV units. The results indeed offered some support for key configurational propositions: CV units were found in practice to have organizational profiles that were aligned with their strategic objectives; and greater internal alignment around particular organizational profiles was associated with higher CV unit performance. In addition, some support was offered for the equifinality (Katz & Kahn, 1978; Gresov & Drazin, 1997) of CV unit outcomes (viz. financial, technological and entrepreneurial outcomes) across types.

Furthermore, those propositions that received only limited (or no) support may still contribute to better theorizing on CV units. For example, while the configurations we theorized were evidenced in practice, the proportion of venture units whose organizational profiles matched their strategic profiles was limited (to only 40 percent of the sample). Furthermore, while fit with the organizational profiles of our four ideal CV unit types was associated with improved venture unit performance, the degree of fit with the strategic profiles of the ideal types showed no sign of being important. These modest findings may in fact reveal useful theoretical insights into CV unit configurations, indicating boundary conditions on the formation of coherent, synergistic configurations (Doty & Glick, 1994; Miller, 1986, 1996) amongst CV units, as well as the nature of selection regimes (Burgelman, 1991) for corporate venturing within organizations. Such boundary conditions may include volatile and highly uncertain institutional environments in which ‘experiments’ with new organizational forms are frequently curtailed, and where the possibility of learning is therefore constrained. In such environments, mimetic isomorphism may be rife, as may the unwitting creation of hybrid structures. Such conditions appear highly applicable to the corporate venturing context and may mitigate against the evolution and diffusion of configurations approximating the ideal types.

Regarding our application of the *exploration-exploitation* dichotomy (March, 1991), and related *ambidexterity* literatures (cf. Duncan, 1976; Gibson & Birkinshaw, 2004; Gupta et al., 2006; Tushman & O’Reilly, 1996), our analyses in Chapters 4 and 5 suggest that these literatures may also usefully inform theory development on the antecedents of CV unit

performance and survival. CV units have traditionally been viewed as a means to separate the ‘innovative’ from the ‘operating’ systems of large firms (Burgelman, 1983, 1984, 1985; Chesbrough, 2002; Galbraith, 1973, 1982). Accordingly, most studies have focused on the explorative role of CV units and their impact on exploration-oriented measures such as innovation and the early recognition of technological opportunities (Dushnitsky & Lenox, 2005, 2006; Maula, 2007; Rice et al., 2000; Wadhwa & Kotha, 2006)⁶⁰.

Conversely, we find it useful to conceptualise CV units in terms of both exploration (building new capabilities for the parent firm) and exploitation (using existing corporate capabilities), as well as the ambidextrous combination of these two learning modes. Our findings suggest a number of important implications for performance and survival of taking this view on CV units. Specifically, there are performance implications to identifying a unit’s emphasis on either exploration or exploitation as a classificatory dimension for types of CV units. A dominant orientation towards exploration privileges a somewhat different profile of organizational characteristics for successful CV unit performance than does a dominant orientation towards exploitation.

In addition, the extent to which a CV unit engages in exploration and exploitation is significantly associated with its survival. This finding suggests a reorientation in theory on CV outcomes may be warranted: instead of focusing almost entirely on factors beyond the immediate control of venture unit staff (Fast, 1979, 1981; Burgelman & Valikangas, 2005), this literature also needs to consider organizational perceptual and evaluative factors that systematically influence the odds of unit survival. Indeed, we find two related conditions under which the likelihood of CV unit survival is enhanced. First, those units engaging predominantly in exploration-oriented activities show higher odds of survival. Second, ambidextrous venture units have an increased likelihood of survival. These findings are explicable in terms of a positive evaluative bias in organizations towards activities that are more “positive, proximate, and predictable” (viz. the qualities March, 1991:85, associates with exploitative learning). Relatedly, ambidexterity serves to legitimate the activities of CV units, making them both more comprehensible (cognitively legitimate) and acceptable (socio-politically legitimate) (Aldrich & Fiol, 1994; Suchman, 1995) to key internal and external constituencies.

⁶⁰ Refer to Keil, Maula, Schildt and Zahra (2008) and Schildt, Maula and Keil (2005) for recent exceptions examining the impact of investment relatedness across a range of corporate venturing governance modes (including alliances, acquisitions and CVC investments) on exploratory and exploitative innovation.

In applying an ‘organizational learning’ lens to corporate venturing, we are consistent with the theoretical direction advocated by a number of prominent entrepreneurship scholars (e.g. Dess et al., 2003; Ireland & Webb, 2007; Zahra, Nielsen, & Bogner, 1999). However, we also seek through our particular application of this lens to both extend literature on corporate venturing as well as to create and test propositions that challenge existing orthodoxy in this domain. We would encourage other scholars to further this approach in developing theory on this under-explored domain.

Contribution to Methods: A key contribution of Study 2 to empirical research on CV units is its unique dataset (Dushnitsky, 2006). While a number of obstacles exist to sampling (especially internally-oriented) CV units and to obtaining data on their organizational characteristics and outcomes, Study 2 takes significant steps to remedy major weaknesses of prior studies. These steps facilitate a more rigorous analysis of the key topic we address in our second research domain (viz. the organizational and managerial antecedents of CV unit performance and survival).

In particular, the three-phase approach to data collection (described in detail in Section 4.3.1 ‘Research Design’) has generated a dataset with the following two benefits for theory testing: (a) covering a wide range of contemporary CV unit forms (including both internally- and externally-oriented units) in sufficient numbers to allow for parametric statistical analysis; and (b) incorporating multiple outcome measures, both of a self-reported perceptual and more ‘objective’ nature.

A second significant contribution of Study 2 to research methods in the domain of corporate venturing is its application of the organizational configurations analysis techniques outlined by Doty et al. (1993). We employed expert ratings to codify ideal CV unit profiles and thereafter used the techniques identified by Doty et al (1993) to assess how the degree of ‘fit’ between actual and ideal CV unit profiles influenced venture unit outcomes. The logic of configurational fit that underlies these analytical techniques represents a significant departure statistically and conceptually from the bivariate logic which has typically characterised thinking on CV units. We suggested (in the section above) that our findings demonstrate fairly convincingly that configurational analysis can usefully be applied to understanding different types of CV units, their associated strategic and organizational characteristics, and their outcomes.

Contribution to Practice: Chapters 4 and 5 also hold a number of managerial implications. Firstly, these chapters suggest a number of important practical implications for cultivating successful *CV unit performance*. Specifically, our configurational analyses indicated that alignment between elements of a CV unit's strategic profile and, particularly, between elements of its organizational profile, are critical to its short- to medium-term performance. In other words, no single CV unit type performs best – even when examined across technological, financial and entrepreneurial capability dimensions of performance. Rather, the better aligned the elements of its strategic profile and (most importantly) the elements of its organizational profile, the better the performance of the venture unit, irrespective of its type. The critical challenges this poses for managers are two-fold: (a) ensuring that a venture unit has clear and consistent strategic objectives, and (b) ensuring that its networks of relationships, venturing activities, and management systems are internally-consistent to enable the achievement of its strategic objectives.

Second, there are also a number of managerial implications for the *survival of CV units*. In light of the picture that previous research has cultivated of CV units as fragile entities highly subject to forces outside their immediate control (Fast, 1979, 1981; Burgelman & Valikangas, 2005), recommendations to organizations on ensuring the survival of highly performing CV units appear potentially very valuable. In this respect, our configurational analysis demonstrates that the type of unit is critical (and not fit with any ideal strategic or organizational profile) to its likelihood of survival. Specifically, venture units that are geared towards the exploitation of parent firm assets and capabilities – i.e. our internal exploiter and external exploiter venture types - tend to survive longer. Units that focus on exploratory roles are at increased risk of early termination, regardless of their performance track-records.

This may be due to corporate executives finding the performance of exploration-oriented units more difficult to assess objectively in the short-term than that of their exploitation-oriented counterparts. It suggests a difficult tension (and bias) to be managed at the corporate level: balancing exploration and exploitation, given the structural imbalances in the predictability and timing of their outputs. For the managers and staff of exploratory venture units, the challenge is that much more pressing and immediate. Defending their records in the face of the often-changing demands of their corporate parents likely involves emphasising the long-term value such a unit can provide to the corporation, building networks of supporters in the parent company, and showcasing success stories.

Furthermore, we suggest that ambidexterity serves to legitimate the activities of CV units, enhancing their chances of survival. In light of the alternative pathways we find towards CV unit ambidexterity, venture unit managers are advised to pay careful attention to building relationships with both internal and external constituencies. In addition to the provision of critical tangible resources, key constituencies may be crucial to attaining and maintaining the vital but intangible resource of legitimacy. One pathway towards venturing ambidexterity entails high engagement (and frequent communication) with three sets of actors – senior executives in the parent company, other business units in the parent company, and members of the venture capital community. It may be more appropriate, however, for managers to pursue an alternative pathway, involving high autonomy from the parent corporation, where the parent corporation presents especially extreme obstacles to a CV unit.

6.3.2 Major Limitations and Suggestions for Future Research

A number of methodological limitations to Study 2 should be acknowledged. These include potentially over-sampling externally-oriented venture units which may raise questions regarding the generalizability of our findings to internally-oriented units. Indeed, CVC units may be keener to advertise their presence to external entrepreneurs and private equity investors through inclusion in the Corporate Venturing Directory and Yearbook than predominantly internally-oriented units. We tried to counteract this bias through efforts to learn of additional units, including asking the 50 individuals we interviewed and working with executives at industry associations to identify CV units; attending prominent corporate venturing conferences to further our search for additional units; and conducting an extensive web-based search. Beyond these efforts, however, it becomes difficult to obtain a comprehensive sampling frame given that there are no legal requirements for public companies to report the existence of a venturing unit where this is not established as a separate legal entity.

The cross-sectional nature of the survey data presents a further limitation, preventing us from drawing strong causal inferences from our findings and from investigating temporal patterns in the venture units. Also, the substantial use of new measures (which we regarded as a necessity given the limited application of many of the constructs to the corporate venturing domain) makes comparability with existing studies somewhat difficult. Furthermore, given the limited nature of public reporting on corporate venturing outcomes (and the confidentially attached to these activities), we needed to rely on self-reported measures given our desire to assess multiple dimensions of performance. We made attempts,

however, to verify the self-reported performance data through obtaining follow-up data on CV unit survival and Venture Economics data on their investment histories.

In addition to suggestions for extensions that we have made previously in the dissertation, and extensions that address the limitations we have described above, there are several areas where we believe further research could be useful. Regarding the topic of configurations in CV units, one interesting extension may be to conduct longitudinal analyses of how venture unit activities and roles evolve over time. During the research interviews we encountered several cases of venture units that had changed types, for example from internal explorer to external explorer types. It would be very interesting to see if any general patterns emerge, such as exploration-oriented units reinventing themselves as exploitation-oriented units, and to observe what triggers changes in the configurational elements and how such changes take place. A second fruitful research area may be for empirically-driven taxonomic work to supplement our theoretically-derived typology. This could serve to validate (or otherwise) our selection of configuration elements and our choice of the four CV unit types. Specifically, the application of fuzzy set analysis (Fiss, 2007) to identifying empirical configurations may prove informative.

A third useful extension may be to examine the functioning and performance of ‘portfolios’ of venture units within parent firms, where different venture units are established for different strategic purposes. Holding parent company constant may provide a useful vehicle to examine conditions which enable or limit the development of divergent venturing configurations. From a normative perspective, such investigations may suggest how (and, indeed, whether) parent companies could successfully manage a diverse portfolio of venture units to achieve a range of strategic objectives, embracing both exploration and exploitation, as well as internal and external forms of venturing.

Regarding the topic of ambidexterity in CV units, we would like to particularly encourage research exploring the following avenues: (a) detailed studies on the processes of resource acquisition and combination by CV units; (b) the roles of building and using capabilities in achieving other corporate venturing objectives; and (c) the practical implications of our findings of CV unit ambidexterity for designing resource allocation and human resource systems for CV units.

6.4 Conclusion

The burgeoning and increasingly influential literature on corporate entrepreneurship is vitally important for addressing perennial difficulties associated with large, established firms – those of rigidity and inertia. Increasing entrenchment over time of mindsets, capabilities and routines (Leonard-Barton, 1992; Nelson & Winter, 1982; Tripsas & Gavetti, 2000) are but some of the challenges to adaptability faced by large, established firms. Corporate entrepreneurship literature takes a refreshingly different perspective, focusing on mechanisms through which firms can engage in venture building and renewal.

This dissertation has attempted take a few steps in this direction through investigating two important but currently little theorized or researched domains of corporate entrepreneurship. It has sought to do so through a combination of asking new questions, applying theoretical lenses seldom utilised in these domains, and seeking to build triangulated, rich databases of primary data on the phenomena of interest. These are early tentative steps into somewhat uncharted territory and will no doubt carry with them significant limitations. We hope, however, that they will contribute at least to raising some questions and ideas for future work on this intriguing and important subject of entrepreneurship in large, established firms.

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