

Copyright

by

Michael Greg Hendron

2008

The Dissertation Committee for Michael Greg Hendron certifies that this is the approved version of the following dissertation:

Structural & Social Integration:

Help or Hindrance to Bottom-up Innovation?

Committee:

Alison Davis-Blake, Supervisor

Pamela Haunschild, Co-supervisor

John Daly

Janet Dukerich

James Fredrickson

Dovev Lavie

**Structural & Social Integration:
Help or Hindrance to Bottom-up Innovation?**

by

Michael Greg Hendron, B.A.; M.B.A.

Dissertation

Presented to the Faculty of the Graduate School of
the University of Texas at Austin
in Partial Fulfillment
of the Requirements
for the Degree of
Doctor of Philosophy

The University of Texas at Austin

May, 2008

DEDICATION

To my wife, Julia

ACKNOWLEDGEMENTS

I have been helped along the way in this endeavor by many individuals, foremost among them Alison Davis-Blake. She has been an outstanding advisor throughout the process, and her wisdom and guidance have been invaluable. I also could not have made it to this point without the well choreographed support of my co-chair, Pamela Haunschild. The insights, direction, comments, and feedback of my entire committee, including, Janet Dukerich, John Daly, Jim Fredrickson, and Dovev Lavie, were also critical in shaping this work and helping me see this daunting task through to completion. I also appreciate the feedback and guidance of many others in the Management Department in the McCombs School of Business, including Ethan Burris, Paul Martorana, Andy Henderson, and George Huber. I appreciate the assistance of other McCombs School of Business staff, including Stacey Rudnick, Director of MBA Career Services, and Cindy Bippert, Internship Coordinator in the Undergraduate Program Office. Both helped immensely with the survey efforts. Generous financial support for this research was provided by the Herb Kelleher Center for Entrepreneurship and the IC² Institute at the University of Texas at Austin.

The path that has led to this point goes back many years. Many helped me find my way, or gave me the confidence to press forward. I owe a special debt to many teachers and mentors, including Mark Kauzer, Roseanne Krane, Steve Marshall, Sam Bodily, Jeanne Liedtka, the late Dana Clyman, Gerry Sanders, Kelly Patterson, and many others. I also would have never made it to this point without the unfailing support of my mother, who has taught me more about the world of management and business than anyone else. I also appreciate the many proactive and innovative individuals I have known over the years who inspired my interest in the topic of this dissertation.

**Structural & Social Integration:
Help or Hindrance to Bottom-up Innovation?**

Publication No. _____

Michael Greg Hendron, Ph.D.
The University of Texas at Austin, 2008

Supervisors: Alison Davis-Blake and Pamela Haunschild

This dissertation investigates factors that influence efforts by lower-level employees to initiate organizational change and innovation from the bottom up. Specifically, I attempt to reconcile competing theories regarding the effects of structural and social integration on individual innovation efforts. One theoretical view posits that integration provides information, ideas, and motivation necessary for innovation. An alternative view is that integration constrains individuals and routines, and thereby hinders innovation efforts. Drawing on both theoretical perspectives, I predict the effects of distinct types of structural integration (e.g., centralization, cross-unit integration, boundary spanning) and social integration determinants (e.g., geographic dispersion, decision process involvement, workplace network size) on the likelihood of individual innovation efforts among lower-level employees. I also consider the effects of interactions of social and structural integration with individual characteristics (i.e., personality, and experience) on innovation efforts. I test these predictions using survey data collected from interns and supervisors in the context of MBA and undergraduate internships. Analyses demonstrate that several aspects of structural integration do influence the levels of individual innovation efforts. For example, centralization and boundary spanning levels of the work unit have inverse U-shaped

relationships with the level of innovation effort. These findings suggest that for certain types of innovation, structural integration can constrain efforts at the extremes (very high or low) and facilitate efforts at modest levels of integration. Predicted social integration effects are largely non-significant, suggesting the need for further consideration and alternative empirical tests of such effects. Nevertheless, the structural integration findings reaffirm the need to bring together both theoretical perspectives (i.e., the view that integration fosters innovation efforts, and the alternative view that isolation and independence are necessary for innovation). By empirically demonstrating that distinct types of integration have unique, yet theoretically consistent effects on several different classes of individual innovation efforts (both process and strategy related), this study contributes to efforts to reconcile these competing theories. Additionally, this research enhances our understanding of a class of little-studied behaviors that play a potentially important role in autonomous strategic change and organizational learning.

TABLE OF CONTENTS

DEDICATION	IV
ACKNOWLEDGEMENTS	V
LIST OF TABLES	X
LIST OF FIGURES	XI
CHAPTER 1: INTRODUCTION & RESEARCH QUESTION	1
Introduction	1
Theoretical Background	6
Research Overview	9
Summary & Document Overview	17
CHAPTER 2: LITERATURE REVIEW	19
Other Constructs related to individual Innovation Effort	19
Antecedents of Individual Innovation Effort	26
Summary	39
CHAPTER 3: THEORY DEVELOPMENT & HYPOTHESES	41
Structural Integration	41
Structural Integration Hypotheses	46
Social Integration	56
Social Integration Hypotheses	62
Interactions With Individual Motivation & Ability	69
Summary	73
CHAPTER 4: RESEARCH METHODOLOGY	75
Sample & Data collection	75
Variables & Measurement	82
Analysis	96
CHAPTER 5: RESULTS & DISCUSSION	98
Descriptive Statistics	98
Selection Model	99
Model Overview & Robustness Checks	100
Control Effects	101
Results & Discussion	104
Summary	115
CHAPTER 6: CONCLUSION & FUTURE RESEARCH DIRECTIONS	116
Summary of Findings	116
Contributions to Theory	118
Contributions to Practice	123
Limitations & Future Research directions	125
TABLES & FIGURES	130

APPENDIX. SURVEY INSTRUMENT ITEMS.....	160
REFERENCES.....	166
VITA	187

LIST OF TABLES

TABLE 1: Individual Innovation Effort Domains	130
TABLE 2: Individual Innovation Effort Examples	131
TABLE 3: Individual Innovation Effort Related Constructs.....	133
TABLE 4: Variables, Measures & Data Sources	137
TABLE 5: Individual Innovation Effort Measure Items and Factor Loadings	139
TABLE 6: Sample Innovation Effort Examples Reported by Individuals	140
TABLE 7: Summary Statistics and Correlations.....	143
TABLE 8: Negative Binomial Regression Results for Process Innovation Efforts	145
TABLE 9: Negative Binomial Regression Results for Core Strategy Innovation Efforts	149
TABLE 10: Negative Binomial Regression Results for Outward Strategy Innovation Efforts ...	153
TABLE 11: Summary of Results	157

LIST OF FIGURES

FIGURE 1: Model Overview	132
FIGURE 2: Structural Integration Determinants.....	134
FIGURE 3: Social Integration Determinants.....	134
FIGURE 4: Diagram of Hypothesis 10	135
FIGURE 5: Diagram of Hypothesis 11	135
FIGURE 6: Diagram of Hypothesis 12	136
FIGURE 7: Diagram of Hypothesis 13	136
FIGURE 8: Curvilinear Effect of Centralization on Process Innovation Efforts	158
FIGURE 9: Curvilinear Effect of Boundary Spanning on Outward Strategy Innovation Efforts.....	158
FIGURE 10: Interaction Effects of Proactive Personality × Decision Process Involvement on Core Strategy Innovation Efforts.....	159
FIGURE 11: Interaction Effects of Experience Breadth × Cross-unit Integration on Process Innovation Efforts.....	159

:

CHAPTER 1: INTRODUCTION & RESEARCH QUESTION

The world hates change, yet it is the only thing that has brought progress.
- Charles Kettering (American engineer & inventor, 1876-1958)

INTRODUCTION

What role do individuals at lower levels of organizations play in organizational change and innovation within firms? Research in the strategic management literature tends to view nonmanagers primarily as human assets, or resources, to be utilized in the execution of strategies determined by executives or managers (Barney, 1991). Line-staff and individual contributors are not typically valued for their ability to initiate change, innovation, or contribute to organizational learning. On the contrary, they are often viewed as anti-change agents, leading to organizational inertia because of their resistance to change (Kimberly & Quinn, 1984). Such perspectives are reinforced by theories which depict top-level managers as the dominant force driving organizational action—whether explicitly or implicitly. Studies of top-management teams (Hambrick & Mason, 1984)—or upper echelons—demonstrate this most clearly. Hambrick and Mason suggested that “[o]rganizational outcomes—both strategies and effectiveness—are viewed as reflections of the values and cognitive bases of powerful actors in the organization” (1984: 193).

Some researchers, recognizing the inherent limitations of focusing exclusively on executives, have encouraged the view that valuable organizational change and strategic action can emerge from lower levels in the organization—from the bottom up. For example, Burgelman’s (1983a, 1983b, 1991) notions of autonomous strategy suggest that processes of internal experimentation are critical sources of beneficial innovations, such as internal diversification. Similarly, Rosenkopf, Metiu and George (2001) demonstrated that mid-level managers can

influence the alliance strategies of organizations over time through their involvement in boundary spanning activities. Others have similarly argued that middle-managers are valuable innovators and leaders of strategic change at the business level, based on qualitative evidence (Kanter, 1982, 2004) as well as empirical findings (Wooldridge & Floyd, 1990). Building on this perspective, Ghoshal and Bartlett (1995) emphasized the need for senior and middle managers to encourage entrepreneurial, innovative behavior throughout the organization.

The above examples tend to emphasize the role managers play as initiators or facilitators of change efforts, rather than the directly examining the role of lower-level staff. However, underlying these perspectives is a recognition that nonmanagerial employees may be uniquely able to contribute to the processes by which organizations adapt to changing environments. For example, Bartlett and Ghoshal (1993) explicitly suggest that front-line employees are best able to identify and pursue entrepreneurial opportunities that may lead to change and innovation because of their more direct interactions with customers, exchange partners, and daily operating processes. Similarly Dutton and Duncan (1987) suggest that employees throughout the organization have much more detailed information than do top level executives about the competitive environment, customers, suppliers, day-to-day operations, or the status of projects. Although none may have a comprehensive view, because of their close ties to the environment (Barney, 1986) front-line employees may be able to notice emerging trends, shifts in competitors' strategies, or potential inefficiencies in production far earlier than a CEO, vice-president, or even mid-level managers because of their first-hand knowledge and experiences.

One route to leveraging this knowledge and insight among staff is the use of championing and internal search routines to identify valuable ideas from the lowest levels of the organization, which are then developed and exploited. Studies of innovation champions (Howell & Higgins, 1990; Howell & Shea, 2001) emphasize the need for managers to foster innovation among their

subordinates and be constantly vigilant to good ideas that can be promoted within the organization. However, as Argyris (1994) points out, for this to be effective managers must do more than simply seek suggestions. He suggests that managers need to encourage a more active organizational self-examination because success requires “employees who think constantly and creatively about the needs of the organization, employees with as much intrinsic motivation and as deep a sense of organizational stewardship as any company executive” (Argyris, 1994: 85). Such stewardship-driven behaviors, over time, may contribute to beneficial organizational learning, and even in some cases the emergence of strategy (Mintzberg, 1973, 1978) should ideas developed and initiated at the nonmanagerial levels spread throughout the organization and influence the ultimate business activities of a firm.¹

These autonomous, self-directed innovation and change efforts among lower-level employees are the focus of this dissertation. That such behaviors have the potential to influence strategic change and organizational learning—consistent with arguments above—is proposed as a conceptual starting point to establish the importance of studying such behaviors. Although understanding the impact of such efforts is an important empirical question, this dissertation is focused on contributing to our understanding of the determinants of such behaviors.

Dissertation Focus & Research Questions

A small but growing body of research has examined constructs related to individual innovation efforts. This research has largely been conducted in the field of organizational behavior, with an emphasis on understanding what leads employees to engage in extra-role behavior, or citizenship behaviors (Organ & Ryan, 1995), including behaviors specifically intended to influence organizational practices and routines (Morrison & Phelps, 1999). These

¹ Such ideas are also consistent with the logical incrementalism view of strategy making (Quinn, 1989), in which smaller subsystems combine in the development of overall strategy. Lower-level employees may also be influential in these subsystem processes.

research efforts—reviewed in detail in Chapter 2—provide a foundation for this study and inform the research questions detailed below. Much of this work has focused on the effect of individual characteristics (e.g., personality or motivation) or contextual factors (e.g., organizational culture or job characteristics) on such behaviors. However, little is known regarding the influence of organizational characteristics on individual innovation efforts at lower levels.

This gap in our knowledge of antecedents provides a potentially rich theoretical domain for further exploration. In particular, it allows for consideration of more general theories of innovation and organizational learning, and predictions regarding the role of integration within organization in hindering or enabling such efforts. These theories are particularly interesting because they suggest contradictory relationships between the level of integration and innovation and change efforts. For example, March (1991) suggests that strong socialization and integration will reduce the likelihood that individuals will introduce variation into their routines because the socialization process fosters conformity to group norms (Trice & Beyer, 1993). On the other hand, greater integration may be associated with awareness of problems or opportunities that may, in turn, motivate change efforts. Furthermore, such integration may provide access to critical organizational knowledge and resources necessary to implement change (Ettlie & Reza, 1992), and also provide a context in which individuals are willing to take risks and demonstrate initiative by taking the lead in introducing innovations in the workplace (Edmondson, 1999).

The integration of an individual within an organization can be influenced by organizational characteristics at two levels. First, *structural integration* reflects the integration of one work unit with other work units in the organization (either laterally or vertically) as well as outside the organization (Lawrence & Lorsch, 1967a). This is likely to influence the ties an individual has outside his or her local workgroup. Second, *social integration* is the degree to which an individual is linked to others within a given group (O'Reilly, Caldwell, & Barnett,

1989). These theoretical concepts of social and structural integration are considered in addressing the gaps in our understanding of the determinants of individual innovation efforts at lower levels of organizations, and motivate my specific research questions.

In particular, I ask: *Does structural integration of the work unit within the larger organization impede or enable individual innovation efforts among work unit members, and if so, how?* Extending this integration logic to the individual level, I ask *how does social integration of the individual employee facilitate or hinder individual innovation efforts?* Given some limited existing knowledge of the individual-level determinants of similar behaviors, it is also important to consider possible interactions between organizational factors and individual determinants, captured by this final research question: *How do social and structural integration interact with individual traits and abilities in influencing the level of individual innovation efforts?*

The incorporation of organizational and unit-level constructs in this study specifically addresses recent concerns in the literature that our understanding of this class of behavior is still limited because of its focus on a narrow range of antecedents (Rank, Pace & Frese, 2004), and also addresses calls for meso-level studies of organizational behavior and action (House, Rousseau, & Thomas-Hunt, 1995; Shalley, Zhou, & Oldham, 2004). Furthermore, it expands concepts of proactive individual behaviors in organizations (Van Dyne, Cummings, & Parks, 1995; Morrison & Phelps, 1999; Frese & Fray, 2001) and links them conceptually with general theories of innovation (Amabile, 1988; Amabile et al., 1996; Kanter, 1988) and strategic change (e.g., Burgelman, 1983).

THEORETICAL BACKGROUND

Constructs and Antecedents in Prior Literature

Studies from several theoretical areas provide a preliminary understanding of potential antecedents of individual innovation efforts. In the domain of organizational behavior there are numerous studies of behaviors among nonmanagerial employees that impact the accomplishment of organizational goals and objectives. However, these streams have tended to focus on behaviors that are less likely to lead to innovation or change in organizational routines or strategies. For example, organizational citizenship behaviors (OCB) are considered beneficial to performance, although they emphasize helping and compliance, rather than change (Organ, 1990). Others constructs, such as voice (Hirschman, 1970) and whistle-blowing (Near & Miceli, 1987) are oriented toward change, however they typically connote reaction to a negative situation, and may not have the ultimate goal of bringing about change.

Although individual innovation effort is somewhat unique in its focus, it is similar to several constructs in organizational behavior, as indicated above. Constructs that overlap with individual innovation efforts include *taking charge* (Morrison & Phelps, 1999), *advocacy participation* (Van Dyne, Graham, & Dienesch, 1994), *making constructive suggestions*, a subcomponent of organizational spontaneity (George & Jones, 1997), *personal initiative* (Frese et al., 1996), *positive deviance* (Spreitzer & Sonenshein, 2004; Cameron, Dutton, & Quinn, 2003), and more general *challenging-promotive behaviors* (Van Dyne, Cummings & Parks, 1995). These constructs provide a useful starting point for operationalization of individual innovation efforts, as well as limited understanding of antecedents to change and innovation efforts, including organizational culture, individual personality, and prior experiences. These findings are considered in greater detail below, however a key observation is that organizational systems and

structures have not been considered in the study of individual innovation behaviors among nonmanagerial employees.

Structural & Social Integration

The concepts of structural and social integration provide a framework to consider the forces that influence the likelihood of lower-level employees engaging in individual innovation efforts. Integration can create opportunities for change through enhancing information flows, interaction, and involvement. At the same time, integration may inhibit the ability to experiment, explore, and innovate, as discussed below. This tension between integration versus isolation as the more favorable contextual condition for change efforts at lower levels is relevant at both the level of individuals within workgroups, and workgroups within the larger organization.

Structural integration, defined as “the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment” (1967a: 11), was introduced as a potentially important factor influencing the ability of organizations to adjust to changing environmental demands very early in the management literature by Barnard (1938). Later research that extended the study of organizational adjustment processes retained this interest in integration (e.g., March & Simon, 1958; Thompson, 1967; Lawrence & Lorsch, 1967a, 1967b). More recent research has returned to these earlier themes and considered structural integration as one of the determinants of an organization’s ability to adapt to a changing environment (Ettlie & Reza, 1992; Gulati, Lawrence & Puranam, 2005), based on the argument that integration enables multiple components of the organization to change in unison. However, it is equally possible that structural integration will hinder attempts to change systems because the tight integration across workgroup and organizational boundaries increase the complexity and effort required to implement a change within the local unit.

Perceptions of greater effort required to implement changes may discourage individuals from initiating such efforts in the first place. Although the integration mechanisms themselves may facilitate change across units by enabling greater coordination, the presence of integration reflects a state of interdependence among units, and is typically implemented in order to overcome the challenges of differentiation across units (Lawrence & Lorsch, 1967a). Thus, the presence or level of integrating mechanisms, such as cross-unit committees, will necessarily require greater levels of consideration and planning when considering changes. This, in turn, is likely to influence individual attempts to modify or alter work routines, or influence strategy, because of the implications for other work units that will be impacted by any changes must be taken into consideration. Thus, dimensions of organizational structure and systems that create stronger integration may have conflicting effects on the likelihood of change and innovation efforts among employees.

Social integration is the degree to which an individual is linked to others within a group (O'Reilly, Caldwell & Barnett, 1989). Thus, social integration conveys a meaning parallel to structural integration, but at the individual level. Although this is operationalized as a multidimensional concept, one of the key aspects is the level of interaction and coordination of activities among group members, both formally and informally. More recent studies have considered the effects of social or behavioral integration on organizational processes, suggesting the importance of individual integration in order to influence group outcomes (Simsek et al., 2005; Smith et al. 1994). The implications for individual innovation efforts include awareness of problems or opportunities that may prompt efforts to introduce change, as well as access to information or other resources that may be valuable in the process of selling or implementing a change. However, as with structural integration, there may be a downside to being highly integrated within a workgroup. As March (1991) suggests, being quickly and strongly integrated

into a group may limit exploratory behavior that could provide beneficial variation and change. Furthermore, the stronger the organizational culture and norms, the lower the likelihood of deviation among group members (Trice & Beyer, 1993). Thus, greater isolation may in fact be a better context for individual innovation efforts.

The concepts of structural and social integration provide an overarching framework for the research model outlined below. The central tension between the conflicting arguments for integration or isolation as the most appropriate contexts to facilitate individual innovation effort are addressed in the hypotheses and empirical tests, introduced below, with the ultimate objective of resolving and reconciling the theoretical contradictions, at least partially.

RESEARCH OVERVIEW

Given the adaptation and novel application of existing constructs in this study, I first provide a more detailed definition of individual innovation efforts, as well as concrete examples to further clarify the concept. After establishing this definition I introduce the overall theoretical model.

A Definition of Individual Innovation Effort

For the purpose of this dissertation, I have adopted the label *individual innovation effort* for those processes and activities through which nonmanagerial employees can influence organizational learning and introduce changes of strategic significance. This label reflects three key aspects of the behaviors. First, they are individual efforts, rather than group or collective efforts. Although the initiative may be demonstrated when acting as part of a team or in a group process, and ultimately require collective effort to be achieved, the emergence of an issue or idea, and the initial attempts to promote and implement the change are considered as individual acts.

Second, these efforts are intended to introduce innovations to some degree, although they may be modest. Innovation reflects the introduction of creative or useful ideas (Amabile, 1988). These ideas need not be entirely new inventions, and could include the borrowing of ideas or practices from elsewhere. However, in the immediate context of the behavior they are novel. Because such innovations may change routines that impact organizational outcomes, they also have the potential to influence the bottom-line performance of an organization by reducing costs and/or increasing revenues (in the case of for-profit enterprises). In other words, these initiatives or ideas—if carried out—would potentially change the manner by which the organization achieves its mission or objectives (although in some cases the impact may be small). Furthermore, the efforts are directed toward lasting changes to the routines or practices of the organization, consistent with the notion of organizational learning, which Levitt and March (1988: 320) define as “encoding inferences from history into routines that guide behavior” (Levitt & March, 1988).² For example, rather than dutifully reworking a defective item each time one appears, an effort is made to discover the underlying causes of the problem and change the processes that lead to the defect in the first place. There is the possibility that in practice, such initiatives may not improve performance (efficiency or effectiveness), nor be adopted or retained by the larger organization. It is also possible that such innovation efforts, or the innovations themselves may be counterproductive. However, for the purpose of this definition, and this study, the actual performance implications (whether positive or negative) are not a concern.

Third, these are termed “efforts” to reflect the early-stage nature of these actions in relation to overall organizational innovation and change processes. It also incorporates the notion that these behaviors do require a proactive demonstration of follow-through, persistence, and engagement. In some cases this effort may be private, or unobserved, but ultimately the

² This is also consistent with Huber’s (1991) definition of organizational learning

individual must engage others in the organization to introduce or bring about change.³ It is important to note that authorization and resource allocations are typically essential for significant organizational innovation and change, and in the case of very large changes, such authorization occurs only at the highest levels. However, the phenomenon of interest here is not necessarily the successful implementation of an innovation, but the impetus and initial source of innovation. The primary proposition is that individuals at nonmanagerial levels are able to initiate changes or innovation of a strategic nature, and thus have an influence on meaningful (and possibly strategic) change at the organizational level. Additionally, the quality of the innovation, in terms of the degree to which it will have a positive impact on some aspect of organizational performance is not measured or considered. The effort alone is the outcome of interest, whether or not it is productive and beneficial.

The actual actions may range from preparing a formal report and presentation promoting a new product concept idea, to modification of work practices to improve effectiveness or efficiency. Table 1 illustrates a number of domains where nonmanagerial employees may attempt to initiate change. They range from administrative, more localized process changes that affect efficiency, to larger scale business initiatives, with a similarly broad range in the potential type and magnitude of impact.

The areas of individual innovation efforts are not entirely independent of the level of the employee. Nonmanagerial employees are more likely to be able to make changes within the realm of administrative or operating processes, and therefore are less likely to influence decisions or actions related to the strategy of an organization. In these areas they are unlikely to have the

³ In many cases these activities will be extra-role, or exceed the expectations of a given position. The operationalization of individual innovation effort is based on the assumption that for nonmanagerial employees, these behaviors will typically be extra-role. However, there may be cases where the implicit or explicit expectation is that the employee will show initiative in developing innovations. The primary behavior of interest will be self-initiated; however the theoretical relationships proposed in this study may be expected to hold whether the behavior is in-role or extra-role, although the base rates will clearly differ.

authority to execute such changes independently. However, it is plausible that such individuals may attempt to take initiative to influence changes across the spectrum of areas described above. Presented in Table 2 are a number of examples that provide anecdotal evidence of such efforts among nonmanagerial employees, as well as further clarify the definition. These examples were gathered through my own observations and communications with acquaintances and colleagues regarding their observations of change initiated by individuals at lower organizational levels.

These examples demonstrate the variety of approaches employees can pursue in attempting to introduce innovations into organizations and influence change. They also highlight the diversity of organizational settings where individual innovation efforts may be observed. In some cases, the attempted change was not ultimately successful or lasting, but all had the potential to have a strategic impact by altering organizational routines to some degree.

Model Overview

As depicted in Figure 1, the proposed model for this research incorporates dimensions of organizational structures and systems that tend to influence the level of structural integration of a workgroup within the larger organization, as well as the social integration of individual employees within the workgroup. The model is comprised of hypotheses in three major areas. The first two areas examine factors influencing structural and social integration, and their direct effects on individual innovation efforts. The third area examines the interactive effect of structures and systems (influencing social and structural integration) and individual level predictors on individual innovation efforts. Each of these components of the model is discussed in greater detail below.

The first component of the model considers the direct effects of structural integration factors on the likelihood of individual innovation efforts. As discussed above, it is not clear that

these are simple linear relationships, with factors leading to higher integration uniformly motivating and enabling innovation efforts among lower-level employees. In Chapter 3 these specific relationships are considered and detailed hypotheses are developed. The dimensions of interest include centralization of authority, cross-unit integration, boundary spanning activities, and non-traditional employment arrangements (e.g., contract employees), and the status of a workgroup as temporary or permanent. For example, boundary-spanning work (Rosenkopf & Nerkar, 2001) and cross-functional interdependence likely expose individuals to more heterogeneous ideas, encouraging exploration which may be reflected in individual innovation efforts. Although not directly considering innovation behaviors, prior research has demonstrated a relationship between nonstandard work arrangements and potentially beneficial organizational behaviors such as voice (Davis-Blake, Broschak, & George, 2003). Similarly, others have theorized that contingent workers are a valuable source of novel ideas and learning (Matusik & Hill, 1998). However, framed as an issue of structural integration, work-units dominated by contract employees may be less integrated with the overall organization because of their quasi-outsider status and weaker identification with the organization, possibly inhibiting the level of innovation effort demonstrated among all members of the workgroup.

The second primary component of the model examines the direct effects of factors influencing the social integration of individuals within the workgroup on the likelihood of individual innovation efforts. Again, as discussed in the previous section, the relationship between tighter individual integration within the workgroup and individual innovation efforts may not be uniformly positive. Although there may be informational benefits, and increased opportunities to change, integration may inhibit individuals' abilities to explore and innovate. As such, a set of hypotheses are developed to test this logic for a number of specific dimensions. Dimensions of interest in this area include geographic dispersion, decision process involvement,

as well as the level and nature of social integration manifested in individuals' workplace networks. For example, dispersed team structures may enhance individual innovation efforts behavior by providing greater autonomy for individuals, through lower supervisory oversight, as well as greater diversity of perspectives. Conversely, physical distance may undermine these behaviors by reducing opportunities for face-to-face interaction that provides a chance to influence others and generate ideas. The consideration of workplace ego networks as an indicator of levels of social integration builds on the work of Ibarra (1993) in considering how network structure motivates and facilitates (or inhibits) individual innovation efforts. Each of the dimensions considered in this section may have a distinct influence on the level of integration for an employee within a workgroup, and thus influence the level of individual innovation efforts.

The third component of the model is the examination of the interaction between individual personality traits and abilities that are likely related to individual innovation efforts, and the level of structural or social integration. These factors are likely to moderate the influences of traits that motivate individual innovation efforts, or abilities that enable those efforts, such that the strength (and possibly the direction) of link between individual-level factors and individual innovation efforts will vary depending on the structures and systems of the work environment. One such dimension is proactive personality (Bateman & Crant, 1993), which considers the tendency of individuals to bring about change in their environment. Structures or systems that reduce social integration may in fact have a positive relationship with individual innovation efforts for individuals with a highly proactive personality, by providing the freedom to explore and innovate. Individuals with a less proactive personality, however, are unlikely to be motivated by independence or to perceive the situation as an opportunity to innovate. Similarly, structural integration may increase the likelihood of individual innovation efforts for proactive individuals, more than less-proactive individuals. These individuals may be more inclined to

utilize information from sources outside the work-unit as a source of change ideas, or notice signals from other areas that indicate the need for change.

In addition to these model components briefly described above, control variables will be included to address concerns of unobserved heterogeneity and alternative explanations, and to acknowledge well documented relationships in the literature that may be associated with the dependent variable measure, as well as key independent variables. These include other organizational factors (e.g., size), work unit characteristics (e.g., supportive culture, and heterogeneity), job factors (e.g., autonomy, and compensation), and individual determinants.

Research Setting and Boundary Conditions

The study setting is internships of business students (MBA and undergraduate) in the McCombs School of Business. This multi-organizational approach will provide variance on the independent organizational-level or work unit-level variables that influence the nature of work unit integration and social integration of individuals. Interns also operate at the nonmanagerial level, making them an appropriate category of employees. The nature and appropriateness of the setting are discussed at length in Chapter 4 along with the discussion of methods, however it is important to briefly address the fit, as well as limitations of this setting. Although the work of interns is necessarily for a fixed period of time, they are not simple “temporary” employees given that internships are often used as a screening process by both the firm and intern to consider possible future long-term employment. Thus the behaviors of interns are likely to correspond well with the behaviors of other full-time entrants to the organization. Furthermore, the internship context should not inhibit the expression of individual innovation efforts because interns can be both motivated and able to demonstrate such initiative. According to McCombs School guidelines, students are advised to locate internships that will allow them to integrate their

experience and learning from courses. Thus, the internship is not simply a low-skilled or rote administrative work setting. In addition, interns bring new knowledge from both courses and their experiences. Anecdotal evidence from recruiters suggests that they expect interns to demonstrate initiative and work to have a positive impact in the organization, even through the introduction of new ideas and change (see more complete discussion in Chapter 4). Because interns typically begin their work without prior experience in the organization, they will be less influenced by organizational culture, and interns may more objectively observe the effectiveness of an organization's existing practices or strategies. Given the above arguments, it is likely that interns will be capable of engaging in individual innovation efforts.

Although interns are widely dispersed, data collection was easily managed using e-mail communication and web-based survey instruments. Data were collected using multiple surveys of interns and their supervisors. Interns provided background and personality data, ego network data, measures of job characteristics, as well as a self-report measure of individual innovation efforts. Supervisors provided measures of organizational characteristics (structural and social integration determinants), organizational culture, as well as other organizational control variables (all using previously validated measures, where available). Data were collected from multiple sources, at multiple time-points, to help ensure the quality of measures and data. Specific data collection procedures, measures, and analytical methods are addressed in detail in Chapter 4.

The theoretical focus and setting of this study do create boundary conditions. Although interns are similar to nonmanagerial full-time employees and will likely be able to demonstrate individual innovation efforts, the newcomer status of interns, and the time-bounded nature of the job necessitate caution when generalizing to other groups of employees. As indicated above, however, their motivations can be expected to parallel those of newcomer full-time employees who are interested in long-term continued employment, promotion, and other rewards.

Nevertheless, generalization from these findings to broader contexts will require caution. The setting also limits the ability to examine aspects of integration that impact initiative behavior over longer time periods. Therefore, the hypothesized relationships focus on behaviors that are likely to be manifested relatively quickly. Nevertheless, these relationships should hold over longer periods of time. This does not eliminate the possibility that longer-term effects of organizational tenure will introduce additional dynamics that influence change and innovation initiatives. Finally, this dissertation does not consider the full life-cycle of organizational innovation and learning in general, and the group aspects of this process in particular. There are certainly group-level processes and effects at work that have not been captured. Furthermore, championing processes whereby a change or innovation initiated at the lowest levels is championed by managers at middle- or upper-levels cannot be considered. The full life-cycle of change efforts, and their ultimate impact on organizational routines, and even organizational performance must be examined in future studies. Such issues and possible questions are considered in greater detail in the discussion of limitations and future research opportunities and extensions in Chapter 6.

SUMMARY & DOCUMENT OVERVIEW

Based on the conceptual argument that nonmanagerial employees can play a critical role in initiating and contributing to organizational learning, innovation, and strategic change, this dissertation seeks to better understand the antecedents of individual innovation efforts. Having set forth the research question and general research design, the following chapter (Chapter 2) addresses in detail prior findings and existing theories regarding the antecedents of behaviors similar to individual innovation effort. Chapter 3 provides greater detail on theoretical perspectives relevant to this study, and presents the development of formal hypotheses.

Additional chapters address the research methodology, testing of these hypotheses, and discussion of the findings and implications for academics and practitioners.

CHAPTER 2: LITERATURE REVIEW

This chapter reviews the theoretical and empirical research relevant to individual innovation efforts. The outcome behavior of interest (individual innovation effort) is similar to several constructs already examined extensively in the literature, providing a useful starting point for further theoretical testing and development. As a foundation, these related constructs are examined in detail, with emphasis on the similarities and differences in relation to individual innovation efforts. Then the current knowledge and theoretical understanding about the antecedents of change and innovation behavior among nonmanagerial employees are reviewed in detail, establishing a foundation for the development and testing of hypotheses.

OTHER CONSTRUCTS RELATED TO INDIVIDUAL INNOVATION EFFORT

In the past decade, proactive employee behaviors intended to benefit the organization have received increasing attention from management researchers. In many cases this interest has emerged from streams of work looking at organizational citizenship behaviors (OCB) (Van Dyne, Cummings & Parks, 1995). As Crant (2000) points out, however, “there is no single definition, theory, or measure driving this body of work; rather researchers have adopted a number of different approaches toward identifying the antecedents and consequences of proactive behavior, and they have examined them in a number of seemingly disconnected literatures” (p. 435). Although it is beyond the scope of this dissertation to fully reconcile these approaches, or integrate the prior findings into a coherent body, the diverse perspectives provide a rich starting point for understanding the phenomenon of interest, and its possible position in the nomological network. I first address the definitional aspect by contrasting individual innovation effort with other related constructs including *proactive personality* (Bateman & Crant, 1993), *advocacy*

participation (Van Dyne, Graham, & Dienesch, 1994), *personal initiative* (Frese et al., 1996), and *taking charge behavior* (Morrison & Phelps, 1999).

Proactive Personality

One of the earliest attempts to observe and study change efforts among organizational members approached the phenomenon as one of individual disposition. Bateman and Crant (1993) developed the construct of *proactive personality* to identify “differences among people in the extent to which they take action to influence their environments” (Crant, 2000:439). In their definition, individuals high on the proactive personality scale are likely to identify opportunities, take initiative in acting on those opportunities, and persevere until achieving some meaningful change. Individuals at the low end of the scale tend to be passive and reactive, and tend to adapt to circumstances rather than change them (Crant, 2000). The self-report personality scale used to assess proactive personality (Bateman & Crant, 1993) is designed to measure traits stable across time and situations, and as such, organizational and other contextual antecedents are not highly relevant and have not been considered in the literature. In this sense, it differs from the individual innovation effort construct, which emphasizes behavioral outcomes in a given context, rather than a dispositional view. Nevertheless, studies that have considered outcomes of proactive personality do provide evidence of the relevance and importance of proactive, change-oriented behaviors among nonmanagerial employees. Results have typically indicated positive relationships with ratings of job performance (Crant, 1995), promotions and salary (Seibert, Crant, & Kraimer, 1999), perceived leadership behavior (Crant, 2000), team productivity (Kirkman & Rosen, 1999), organizational innovation (Parker, 1998), and entrepreneurial behaviors (Becherer & Maurer, 1999). Although not typically measured in these studies, it is implied that these benefits and outcomes are the result of individual innovation behaviors.

Building on this assumption, proactive personality can be considered an ideal construct for inclusion in the empirical examination of antecedents of individual innovation efforts as a dispositional control variable. Furthermore, I consider explicitly how organizational determinants of structural and social integration moderate the link between this personality trait and the manifestation of specific innovation behaviors in a given context. Additional discussion of proactive personality, and its relation to individual innovation efforts, are included below and in subsequent chapters.

Advocacy Participation

Van Dyne, Graham, and Dieniesch (1994) approached the phenomenon of individual change efforts from the perspective of organizational citizenship behavior, and isolated *advocacy participation* as one component of an overall measure of OCB. The items comprising this measure reflect behaviors such as making suggestions for change, encouraging and challenging others to improve skills and knowledge, and promoting independent thinking and voice among the workgroup. The authors describe these as “behaviors targeted at other members of an organization... reflecting a willingness to be controversial” (Van Dyne, Graham, & Dieniesch, 1994:780). Although this implies an orientation toward change, the measure captures primarily voice behaviors, rather than actual efforts to introduce changes or innovations. Since this construct emerged through exploratory factor analysis (using items motivated ex ante by theories of participatory behavior), it does provide evidence that individual innovation behaviors are distinct from other types of OCB, including social participation (i.e., helping behaviors) and functional participation (i.e., self-improvement behaviors) (Van Dyne et al., 1994). Research in this area also provides some limited tests of antecedent relationships of behaviors of this type (discussed below in this chapter). Unfortunately the outcomes and consequences of advocacy

participation have not been examined empirically, so the impact of these advocacy behaviors on organizational outcomes is unclear.

Personal Initiative

Motivated by an interest in cross-cultural differences in workplace behaviors, Frese and colleagues (1996) examined the level of initiative demonstrated among nonmanagerial employees in former East and West Germany. Their construct, *personal initiative*, as refined in a later study (Frese & Fray, 2001), reflects behavior that is self-starting, proactive, and persistent. Self-starting behavior implies that it must be initiated by an individual without explicitly being directed. Proactivity refers to behavior with “a long-term focus” that is not necessarily driven by a need to respond to an immediate demand or problem (Frese & Fray, 2001: 140). The final characteristic, persistence, is incorporated given the likely need for individuals to exert sustained effort to overcome the barriers (e.g., technical barriers, individual resistance, initial failures, etc.) that arise when attempting to introduce changes to processes, procedures, or tasks. Taken together, personal initiative is quite similar to the definition of individual innovation effort used in this study. It was also initially developed with low-level, nonmanagerial employees as the focal level of analysis—again similar to this study. However, in the initial examinations (Frese et al., 1996, 1997) it was considered primarily as a dispositional characteristic, rather than as a class of situation-specific behaviors. In this study the focus is on context-dependent actions, rather than traits. Furthermore, individual innovation efforts include change attempts beyond basic processes and routines (as in *personal initiative*), such as attempts to influence the organization’s strategy, including product strategy (e.g., features and design, marketing approaches), or broader business strategies, such as movement into new business areas.

Taking Charge Behavior

Not long after the concept of personal initiative was proposed, a very similar construct—*taking charge behavior*—was introduced by Morrison and Phelps (1999). Taking charge builds on the premise that OCB and extra-role behaviors among employees are beneficial for organizations (Organ, 1990; Organ & Ryan, 1995), yet are insufficient to bring about important organizational changes. Morrison and Phelps define taking charge as “voluntary and constructive efforts, by individual employees, to effect organizationally functional change with respect to how work is executed within the contexts of their jobs, work units, or organizations” (1999: 403). They further characterize taking charge as being discretionary, and specifically oriented toward improving the organization. This definition, because of its change orientation, clearly distinguishes taking charge behavior from other in-role behaviors and extra-role behaviors that reinforce status quo processes. It is also characterized as a situation-specific behavior, rather than purely an individual disposition. As such, this construct definition is the most consistent with the individual innovation effort construct, and is the basis for the measurement items used in this study. However, like personal initiative (Frese et al., 1996), taking charge does not incorporate changes that go beyond administrative, process oriented changes, so for the purposes of this study I will augment the measure to capture individual innovation efforts in these areas as well.⁴

Summary & Additional Related Constructs

All of the concepts above have been examined in the context of nonmanagerial employees, providing a robust set of related constructs that can be used to define our current understanding of the antecedents of individual innovation effort. Other related behavioral

⁴ As with personal initiative, there is no conceptual exclusion of more strategic changes from *taking charge behavior*. In personal communication with Elizabeth Morrison (2006), however, she did indicate that it was a conscious choice to limit the measurement items to more process-oriented change, rather than changes to an organization’s strategy.

constructs, such as *improvement oriented voice*, defined as “speaking out and challenging the status quo with the intent of improving the situation” (LePine & Van Dyne, 1998: 853), or *making constructive suggestions*, a subcomponent of organizational spontaneity (George & Jones, 1997; George & Brief, 1992; Katz, 1964), are distinct from individual innovation effort because they focus on voice without action. However, insights from theorizing and research in these related areas further contribute to our understanding of change-oriented behaviors, as discussed below. Attention to this area continues, with the recent introduction of *positive deviance*, defined as “intentional behaviors that depart from the norms of a referent group in honorable ways” (Spreitzer & Sonenshein, 2004: 832). Given the lack of empirical study of this and other conceptual constructs (i.e. *challenging-promotive behaviors* in Van Dyne, Cummings & Parks, 1995), as well as their overlap with constructs already identified, I will not specifically consider these constructs.

Other more general process constructs, such as entrepreneurship, creativity, and organizational innovation, also overlap with the concept of individual innovation. Frese and colleagues (1996) explicitly suggested such a connection. Entrepreneurship refers to “behaviors that include demonstrating initiative and creative thinking, organizing social and economic mechanisms to turn resources and situations to practical account and accepting risk and failure” (Hisrich, 1990: 209). Entrepreneurial perspectives that consider individual behaviors in organizations, such as *intrapreneurship* (Hisrich, 1990) align well with the concept of innovation efforts among low-level employees. Creativity generally refers to the development of novel concepts (Amabile, 1988), but has been considered as an individual trait (Oldham & Cummings, 1996), a group or organizational process (Drazin, Glynn, & Kazanjian, 1999), and as an outcome (Ford, 1996). In spite of this ambiguity, creativity studies at the individual level provide relevant

insights into our current understanding of antecedents of the behaviors of interest in this study. Innovation research more broadly can also inform our current understanding.

A common definition of innovation is the successful implementation of creative or useful ideas (Amabile, 1988), including the adaptation and adoption of products or processes originating outside the organization. While there is some research that has considered organizational antecedents to innovation, most have focused at the organizational innovation level of analysis, rather than considering the initiation of innovation efforts (cf. Damanpour, 1992). Even the similar work of Ibarra (1993) focuses on successfully implemented innovations at the organizational level. The emphasis of this study is on the effort to innovate at the individual level, regardless of the ultimate implementation. Scott and Bruce (1994) did introduce the notion of innovation behaviors as an outcome of interests, although the emphasis was on attitudinal determinants, and little follow-up work has been done in this area. Also in the domain of innovation research, studies of *innovation champions* (Howell & Higgins, 1990; Howell & Shea, 2001) are relevant given the emphasis on individual innovation efforts, however the championing behavior is often assumed to be a managerial role, and thus does not capture the behaviors of low-level initiators of innovation. In a slightly more indirect way, the concept of *issue-selling* (Dutton & Ashford 1993; Dutton et al., 1997), which examines attempts to influence change in a bottom-up fashion, can provide grounded knowledge that strengthens the foundation of this dissertation. Given the overlap of these constructs with individual innovation efforts, findings from prior studies in these domains are incorporated where relevant. Table 3 below contains a summary of the similarities and differences between these related constructs and individual innovation efforts.

ANTECEDENTS OF INDIVIDUAL INNOVATION EFFORT

Individual Level Determinants

Although the focus of this dissertation is not on the individual-level determinants of innovation efforts (e.g. personality), it is critical to consider briefly our current state of knowledge in this domain. Much of the research interest has focused on dispositions and attitudes as predictors of extra-role and supportive workplace behavior among lower-level employees. In a meta-analysis of 55 studies of OCB, Organ and Ryan (1995) examined the relationships between "Big Five" (McCrae & Costa, 1987) personality constructs and the altruism measures of OCB. They concluded the conscientiousness has the strongest and most robust predictive relationship with this behavior; however agreeableness and positive affect were also significantly related. In their study of taking charge behavior, Morrison and Phelps (1999) found a significant positive relationship between felt responsibility and individual initiative. Similar to conscientiousness, felt responsibility implies that an individual feels personally obligated to bring about change and influence the welfare of the organization. The same study also found support for a positive relationship between generalized self-efficacy (Gist & Mitchell, 1992) and efforts to introduce change, suggesting that confidence in one's own abilities to accomplish an objective is a critical enabler of proactive change-oriented behaviors. Bateman and Crant (1993) examined correlates of proactive personality measures and found that both need for achievement and need for dominance were predictive of more proactive personality measures, yet an internal locus of control was not significantly related. Given the similarity between self-efficacy and internal locus of control, the non-finding is somewhat surprising, but may be due to the operationalization of the dependent variable as a disposition rather than specific behaviors in context. Overall, however, these findings suggest that because innovation and change initiatives require

considerable effort—perhaps without direct incentives or rewards—personality traits (i.e., conscientiousness or need of achievement) are essential motivational forces.

Proactive personality (Bateman & Crant, 1993), introduced above, is a unique construct in that it is defined as a disposition, yet it captures much more contextual behavioral tendencies than do core personality traits such as the Big Five. Although it appears to be a valid personality measure, it likely operates as a mediator between other basic personality traits and observed change efforts. For example, conscientiousness is significantly correlated with proactive personality (Bateman & Crant, 1993), and therefore the influence of conscientiousness on the likelihood of individual innovation effort may be partially mediated by proactive personality given the closer conceptual link between proactive personality and such efforts. Crant (2000) has proposed that proactive personality leads to observed change oriented behaviors such as challenging the status quo and innovation, yet this relationship is largely untested. Although a number of studies have demonstrated links between proactive personality and outcomes such as job performance or career success (Crant, 1995; Seibert, Crant, & Kraimer, 1999), the actual link between this dispositional measure and change oriented behavior has only been tested once. Thompson (2005) found a positive relationship between proactive personality and initiative taking, partially mediated by network building activities. Given the need to further increase our understanding of the link between proactive personality and such behaviors, as well as its greater conceptual relevance compared with Big Five personality measures, proactive personality is considered theoretically and empirically in this dissertation as well.

Other individual dimensions, such as knowledge, skills, or ability have been considered less frequently in this domain because they are assumed to influence in-role task performance, rather than extra-role behaviors where motivation is a primary determinant (Organ & Ryan, 1995). Meta-analyses by Podsakoff and colleagues (Podsakoff, MacKenzie, & Bommer, 1996;

Podsakoff, MacKenzie, Paine, & Bachrach, 2000) also found no significant relationship between ability, experience, or knowledge across a wide range of OCBs (altruism, helping, courtesy, and sportsmanship) with the exception of civic virtue. In a study focused specifically on change attempts, Morrison and Phelps (1999) also did not find a significant relationship between expert power—defined as “possession of critical and unique skills or expertise” (p. 411)—and efforts to introduce change. While the evidence seems to indicate that some categories of individual abilities may not be predictive of change efforts, given the greater complexity of initiatives intended to introduce innovations inside organizations, individual ability is more likely to be an important determinant. As such, individual ability (as determined by breadth of experience) is considered as a theoretical determinant of individual innovation effort, in interaction with other contextual characteristics.

Attitudinal & Cultural Determinants

Other individual-level predictors of behaviors similar to individual innovation effort that have been considered in the literature have been largely attitudinal. More general studies of OCB have focused on factors such as job satisfaction, organizational commitment, perceived fairness, and perceptions of leader supportiveness (Organ & Ryan, 1995; Williams & Anderson, 1991). These factors all show a very strong positive relationship with altruistic organizational behaviors, but the causal direction is ambiguous in many cases (Organ & Ryan, 1995). For example, it is not clear whether individuals are participating in extra-role behaviors because they are happy with and committed to their organization, or whether it is in fact the behavior itself that leads to the satisfaction and commitment. Perceived fairness and supportiveness are somewhat easier to isolate as antecedents, although there still may be issues of reverse causality. Nevertheless, these perceptions can logically be ascribed to individual observations of managerial behavior, group

norms, and other factors generally categorized as cultural variables (see below). While perceived supportiveness can be generally argued to have a positive effect, attitudinal predictors are also ambiguous in terms of the sign (positive or negative) of the relationship. In the domain of voice behaviors, dissatisfaction and organizational support were found to interact, such that unhappy employees in an environment perceived as supportive of employee contributions were more likely to share creative ideas (Zhou & George, 2001), highlighting the motivating potential of negative attitudes.

The direct effect of cultural factors has also been demonstrated in studies focused on change and innovation efforts. Morrison and Phelps (1999) considered both top management openness and norms for supportiveness of change as predictors of taking charge behavior. Managerial openness to initiatives from lower-level employees was significantly related to individual change efforts and initiative, however group supportiveness for change was not. It is possible that the supervisory influence is much stronger than the general norms within a workgroup. The two are highly correlated ($r=.49$), however, so it is difficult to be certain of the specific nature of the relationships due to possible collinearity. West and Anderson (1996; Anderson & West, 1998) did find a significant positive effect of group culture (both supportiveness for change and participatory behavior) on innovativeness, although their study considered top managers, and examined group innovation rather than individual behaviors. Perhaps at the lower levels of organizations, the most salient determinant of perceived supportiveness is the direct supervisor. Other studies have found effects supporting this general view. Baer and Frese (2003) found that both perceived psychological safety (Edmondson, 1999) and a climate supportive of change were critical determinants of the successful implementation of process changes. Meta-analyses (Podsakoff et al., 2000) have also demonstrated the consistency

of empirical evidence for the impact of leader and organizational supportiveness on the likelihood of OCB.

Additional evidence suggests that these findings apply to employee initiative behavior, as well. Scott and Bruce (1994) also found that general supportiveness, as well as stronger manager-subordinate relationships (LMX), led to increased individual innovation behaviors. Similarly, in a study of employee “ecoinitiatives,” supervisory support was again found to be a strong predictor initiative (Ramus & Steger, 2000). Researchers have proposed and demonstrated that this supportiveness functions through enhancement of self-efficacy feelings and the fostering of goal-oriented and problem-directed behavior (Redmond, Mumford, & Teach, 1993). In addition, organizational norms that allow for introduction of divergent ideas, as well as trust-based relationships with supervisors, reduce the perceived risk of pursuing changes within the organization (Ashford, Rothbard, Piderit, & Dutton, 1998; Scott & Bruce, 1994).

Other tests of more distant relationships between culture and innovation have been inconclusive. Abbey and Dickson (1983) did not find a significant effect for cooperative culture (encouraging working together rather than competition), but did find that a flexible culture (openness to change and experimentation) was related to organizational innovation. Empirical tests of Amabile’s (1988) theories of organizational creativity do provide strong evidence of cultural effects (Amabile, Conti, Coon, Lazenby, & Herron, 1996). Both organizational and supervisory encouragement, as well as workgroup supports, were found to be higher in workgroups demonstrating more creative outputs (i.e., innovation), although these findings are undermined by questions of causal ambiguity given retrospective measurement of innovativeness and contemporaneous measures of culture and organizational factors (Amabile et al., 1996). Perhaps the safest conclusion to draw from these studies is that supportive organizational climate and cultural factors likely have a promotive influence on efforts to initiate change or innovation

however the relationship is strongest when those cultural signals are proximate to the employee (i.e., supervisory behavior). More distant or general supportiveness (i.e., statements by the CEO encouraging innovation) are likely to be less relevant and less motivating for individuals. One way in which more general organizational culture may influence behavior, however, is through translation of values into job characteristics or organizational policies. Evidence from this domain is addressed in the following section.

Job-specific Antecedents

The individual and cultural determinants that have been empirically verified portray a consistent picture of the key role of motivation as a critical mechanism in the creation of behaviors similar to individual innovation effort, whether the motivations comes from internal factors (such as a personality trait), or external factors such as encouragement and support from a supervisor. Similarly, specific job characteristics also have important motivational qualities that can encourage individual efforts to introduce changes or innovations. For example, Arthur and Aiman-Smith (2001) found that implementation of a gain-sharing program significantly increased the volume of employee suggestions, although the effect gradually diminished over time. In a number of studies contingent rewards have been shown to foster citizenship behavior, although intrinsic factors, such as intellectual stimulation and non-routine task environments also had a positive effect on citizenship behaviors (Deckop, Mangel, & Cirka, 1999; see Podsakoff et al., 2000 for review and meta-analysis). Similar results have been found in studies of creativity (Oldham & Cummings, 1996; Amabile et al., 1996; Shalley, Zhou, & Oldham, 2004), and at the organizational-level where innovativeness has been found to correlate with performance-based rewards (Abbey & Dickson, 1983).

Other research has considered key dimensions of the job task, including job complexity and autonomy. Several studies have found both autonomy and complexity to independently increase the level of employee creativity (Oldham & Cummings, 1996; Amabile et al., 1996). Speier and Frese (1997) found a link between autonomy (termed “control” in their study) and levels of personal initiative, however complexity was not significantly related to initiative. This study was also one of the few to consider moderated relationships, examining the link between autonomy and self-efficacy. Results demonstrated that high self-efficacy individuals will tend to show more initiative in less favorable work contexts (i.e., low autonomy), but in high-autonomy environments both high and low self-efficacy individuals demonstrated similarly high levels on initiative.

At the level of organizational innovativeness, autonomy and task structure (formalization) have not been found to impact the overall level of innovation (Abbey & Dickson, 1983). This demonstrates the potential difficulty in assuming determinants of individual behavior extend to group level outcomes. Furthermore, this study of R&D organizations emphasized technical innovations, the development of which may have been the primary objective of these employees (Abbey & Dickson, 1983). Therefore, job formalization and lack of autonomy may not have an inhibiting influence—as hypothesized in most studies of change-oriented behaviors—when explicit role requirements include innovation.

Other aspects of a specific job, such as the nature of evaluative feedback provided, and the time pressures of the job, have been argued to have motivational effects (both positive and negative) impacting individual creativity (for a review see Shalley, Zhou, & Oldham, 2004). For example, judgmental evaluations have been argued to undermine intrinsic motivation and create a heightened sense of the risk of failure, thus undermining creative activities (Amabile, 1979; Szymanski & Harkins, 1992). However, developmental or constructive evaluation has been

shown to have the opposite effect of encouraging creativity and risk taking (Shalley, 1995; Zhou & Oldham, 2001). Both findings again highlight the apparent sensitivity of individuals to contextual factors that may motivate or inhibit potentially risky behaviors such as experimentation or initiative. These are consistent with findings related to supervisor supportiveness outlined above, and demonstrate that formal processes and policies can overlap with managerial style as critical antecedents. Time pressure—which also stem from formal job characteristics, cultural norms, or external forces—has apparently conflicting effects on creativity. For example, marketing professionals were found to be less creative under pressure (Andrews & Smith, 1996), while scientists were found to be more creative given a short time deadline (Andrews & Farris, 1972). No researchers have yet attempted to identify the moderating factors that could explain the discrepancies, nor has this line of research directly addressed initiative or proactive behaviors specifically. Nevertheless, this provides further evidence that contextual factors are important when studying individual innovation efforts.

Work-unit Structural Antecedents

The group or work-unit structure is an important contextual influence on employee behavior, however few researchers have considered these as antecedents to individual innovation-type behaviors. Interdependence has been considered in several studies, however, these studies have focused more on extra-role behaviors than change efforts. For example, Pearce and Gregersen (1991) found that interdependence in the workplace increased the likelihood of extra-role behaviors, mediated by an increased sense of felt-responsibility. Similarly, Chattopadhyay (1999) found that task interdependence also increased the likelihood of altruistic citizenship behaviors. Nevertheless, our understanding of this aspect of work structure in relation to change efforts specifically is limited, thus highlighting the need for further study.

Other structural factors, such as heterogeneity among workgroup members, have also been hypothesized to influence the level of change oriented behavior. Basic demographic heterogeneity has been demonstrated to diminish levels of altruistic OCBs (Chattopadhyay, 1999), however helping behaviors directed toward others could be expected to be driven by homophily. As for more change oriented behaviors, other types of heterogeneity are likely more important. Ancona and Caldwell (1992) examined both functional and tenure heterogeneity in new product development teams. No tenure heterogeneity effect was found, however functional diversity was associated with increased breadth of communication, which was in turn positively related to managerial ratings of innovativeness. When the mediating effect of communication is controlled for, however, the direct effect of functional heterogeneity is negative. These findings provide valuable insights, but raise additional questions about the specific processes by which functional diversity influences innovation. Because innovation was measured at the group level, and only in terms of fully implemented outcomes, it is not clear how functional heterogeneity may influence individual attempts to initiate change and innovation.

Recently researchers have begun to consider less formal aspects of organizational and work-group structure—such as the social networks of employees—and their impact on innovation or change efforts. One study of entrepreneurial teams starting new ventures found significantly higher levels of innovation in teams with more diverse social networks and greater reliance on weak-ties, suggesting the importance of novel information in the process of innovation (Ruef, 2002). Obstfeld (2005) found similar effects for network diversity in the level of involvement in internal innovation activities in automotive engineering groups, however he also found that more dense networks, and a tendency for individuals to formally bring together unconnected others in their network, were related to higher levels of innovation. This contrasts with structural-holes theories of the value of brokering behavior in networks (Burt, 1992), and suggests that more

inclusive network behavior is valuable in the process of facilitating change and innovation within organizations. The only early study of social network position and innovation approached the question from one of sources of power and influence (Ibarra, 1993). In this study, network centrality was found to correlate with involvement in administrative innovations. The author explained this finding by arguing that network centrality reflects power and influence within the organization, which in turn leads to involvement in organizational change processes. Although not specifically structural characteristics, network position and overall ego network structure are likely influenced by more formal workplace structures and systems. A recent study of new product development teams found that virtuality, or geographic dispersion, can affect the nature of the network structure, and either inhibit or enhance team creativity (Leenders, Van Engelen, & Kratzer, 2003). In contrast to the findings regarding individual involvement above, this study found that the presence of very central team members inhibited innovation and creativity. The limited empirical evidence discussed above indicates the important influence of social networks on innovation efforts. Our limited knowledge, however, suggests the need for continued study.

Organization-Level and Environmental Antecedents

Much less is known about the effects of organizational structure and characteristics as determinants of individual efforts to initiate change and innovation. Studies of innovation have considered organizational characteristics such as size and structure when assessing innovation outputs. These studies typically consider outputs at the organizational level, rather than specific individual behaviors. There is evidence, however, that organization-wide factors can enhance individual innovativeness (Bharadwaj, & Menon 2000), and that these processes are distinct from the individual or work-group-level drivers on innovation already described above. In a study of corporate entrepreneurship—the tendency for firms to proactively pursue innovation and risk-

taking—a link was found between decentralized decision-making at lower levels of the organization and entrepreneurial behavior (Barringer & Bluedorn, 1999). The same study, which examined 129 manufacturing firms, also found that larger organizations were less likely to foster entrepreneurial behaviors, perhaps due to increased bureaucracy or rigidity in companies with more employees.

Qualitative studies of strategy process similarly suggest that an organization-wide orientation toward flexibility and decentralized decision making is critical for individual entrepreneurship and autonomous strategy processes (Burgelman, 1983a, 1983b). Other researchers have also suggested that the division of labor within an organization can influence the likelihood of efforts to introduce changes. Specialization and departmentalization may inhibit change efforts, while organizations structured to encourage change through formalization of innovation champion roles at lower levels of the organization will foster more initiative among nonmanagerial employees (Galbraith, 1982). Empirical studies have demonstrated the link between individual championing behavior roles and successful implementation of innovations (Day, 1994; Dougherty & Hardy, 1996), although much of the evidence is anecdotal (Howell, Shea, & Higgins, 2005). Nevertheless, structuring the organization to foster innovation and change is likely to be a strong force to enable innovation from the bottom up.

Research examining organizational determinants of specific types of innovations (i.e., administrative vs. technical, or product vs. process) found that not all types are similarly influenced by organizational factors. For example, Damanpour (1987) found that size was positively related to administrative innovation, but not technical innovation. The positive relationship between size and innovation contradicts the later study cited above (Barringer & Bluedorn, 1999), highlighting a question that has attracted much attention. In a meta-analysis of studies linking size and innovation, Damanpour (1992) further explored this relationship, finding

that the positive link is strongest when considering implementation rather than initiation, large scale innovations, and in manufacturing rather than service organizations. For example, Ettlie (1983) found a positive relationship between size (number of employees) and both radical and incremental innovation in the food processing and packaging industry. These relationships suggest that organizational size is beneficial when the innovation requires significant resources, such as in capital intensive manufacturing businesses. Since individual change efforts are likely to be small in scale or have limited resource requirements—at least when first emerging—size may be less relevant than other organizational factors, such as bureaucracy or complexity.

Studies that have examined both size and other organizational factors simultaneously, such as centralization or formalization, have found a strong negative relationship between more bureaucratic environments and innovation (cf. Damanpour, 1996a, 1996b). Meta-analyses examining these relationships find that the strength of this relationship is contingent on a number of factors. Formalization did not inhibit technical or product innovations, although centralization did have a negative effect on technical innovation (Damanpour, 1996b). Similarly, Abbey and Dickson (1983), found some evidence suggestive of a negative effect of organizational hierarchy (termed status polarization) and decision centralization on organizational innovation. However, it appears that size interacts with structural factors, such that the dampening effect of centralization can be greater in small organizations for example (Damanpour, 1996b). Again, the lack of evidence at the individual level leads to some uncertainty about the true nature of the relationship and the specific mechanisms by which organizational structure influences the level of individual innovation effort. This dissertation addresses some of these limitations.

Organizational slack has also been considered as a determinant of innovation from multiple perspectives. Although the relationship between slack and innovation generally has been considered at the organizational level, the logic does incorporate notions of individual

initiative. One perspective suggests that greater resource availability throughout the organization enables employees to pursue innovative initiatives (Cyert & March, 1963). Another suggests that excessive slack may reduce the motivation to innovate, while low levels of slack may encourage innovation (Leibenstein, 1969). Empirical findings are mixed. Damanpour (1987) found no significant relationship between slack (profits over 5 prior years) and the adoption of innovations. Nohria and Gulati (1996) examined slack at the department level and found a curvilinear (inverted U-shaped) relationship, such that innovation was highest at modest levels of slack. This suggests that umbrella measures of organizational factors such as slack may not be relevant to individual innovation at lower levels because of the high-levels of variance within organizations on such measures. Nevertheless, the mixed findings suggest that slack may enable innovation effort up to a certain point, with possible restraining effects if it exceeds a certain level.

Other researchers have suggested that conditions outside the organizational boundary will also have an effect on innovation within the organization (Damanpour, & Gopalakrishnan, 1998). Such links have not been tested empirically at the level of individual actions, although it is possible that environmental dimensions of dynamism in particular (stability and predictability) (Dess & Beard, 1984) may influence the perceptions, and in turn actions of employees who are sensitive to external conditions. The general propositions, however, tend to focus on the appropriateness of organizational structures in a given environmental context based on the potential value of innovation and change (Damanpour, & Gopalakrishnan, 1998). The work considering innovation and the environmental context draws upon the open systems perspective of organizations (Ackoff, 1981; Scott, 1998), and studies therefore tend to focus on the interaction between external conditions and internal processes or structures, and their ultimate impact on innovation and organizational performance (cf. Decanio, Dibble, & Amir-Atefi, 2000; Ettl, 1983). Although these arguments are less relevant when considering the likelihood of

individual attempts to change their organization, such propositions suggest the importance of considering environmental stability as an influence on individual behaviors, whether the stability is in the internal environment, or the external industry setting. Although industry characteristics are not considered in this study, this gap suggests that there are ample opportunities for future studies of individual innovation efforts.

SUMMARY

This chapter has introduced and reviewed the central constructs in the literature related to individual change efforts, in order to both further clarify the definition of the phenomenon of interest, and to describe the empirical landscape in which researchers have considered factors that influence such behaviors. The great breadth of antecedents considered, from individual traits and dispositions, to macro organizational and environmental factors, suggests the universal interest in similar phenomenon. As this review demonstrates, however, these various perspectives reflect differing assumptions about the appropriate levels of analysis of the phenomenon (individual, group, or organizational) and the theoretical perspectives to be applied. Nevertheless, a number of consistencies do appear.

First, individual change efforts are strongly influenced by motivational forces, whether they intrinsic or extrinsic, formal or informal. Individuals are aware of the potential risks and rewards of initiating change and innovation, and will only do so when the conditions appear favorable. Second, an individual's ability to bring about change appears to have less to do with formal expertise or knowledge, and more to do with interpersonal skills and the ability to influence processes informally. This mixed evidence of the link between ability and change efforts suggests that this is an area where gaps in our understanding remain. Finally, the factors in the organization that create opportunities for individual innovation efforts are the least well

understood. Simply stating that an organization has a culture that supports innovative behavior implies that such activities will be encouraged, or at least not discouraged, but it does not specifically address what in the organization or context that leads to opportunities to initiate change.

In the next chapter I return to my primary research questions to build upon and address several of these gaps in the prior literature. Drawing upon theories of social and structural integration, as well as perspectives already grounded in the study of constructs similar to individual innovation effort, I address in greater detail how organizational structures, systems, and process influence the motivation, ability, and opportunity for individuals to engage in individual innovation efforts. Further, but incorporating several of the prior findings (e.g., the role of proactive personality) and specifically hypothesizing moderating relationships I directly build on work within this extensive body of literature reviewed above.

CHAPTER 3: THEORY DEVELOPMENT & HYPOTHESES

In this chapter I develop a set of hypotheses to address the research questions of this dissertation. In order to provide a clear theoretical foundation and cohesive organization for the hypotheses, I first discuss theories of structural and social integration in greater detail. In developing the formal hypotheses, which consider the relationships between a number of determinants of structural and social integration and the likelihood that individuals will engage in individual innovation efforts, I address the tension between mechanisms that both foster, as well as discourage individual innovation efforts.⁵ Exploration of this tension between integration versus isolation as the more favorable contextual condition for change efforts at lower levels is a central objective in the development of hypotheses and the dissertation overall. Finally, additional hypotheses are developed that consider the interaction effects of integration determinants with two individual-level determinants: proactive personality and breadth of experience.

STRUCTURAL INTEGRATION

Notions of structural integration have their roots in the earliest attempts to formally define organizations. Barnard (1938) emphasized the need for coordinated activities across organizational sub-units in his definition of an organization as “a system of consciously coordinated personal activities or forces” (p. 73). He suggested that the primary focus of authority, or executive roles, in an organization is “the formulation of purpose and transmission of coordinating prescriptions” (Barnard, 1938: 184). As later researchers built upon this early

⁵ Predictions in this section specifically address the likelihood that individuals will engage in innovation efforts (i.e., the frequency of such attempts). They do not address whether the innovations are fully implemented, nor do they address the quality of the innovations in terms of impacts on organizational or individual outcomes.

systems view of the organization, they more formally defined the notion of structural integration as a mechanism whereby organizations can both effectively achieve their stated objectives, and also adapt to changes in their environment (March & Simon, 1958; Thompson, 1967; Lawrence & Lorsch, 1967a; 1967b).

Lawrence and Lorsch recognized that inevitable specialization and division of labor in organizations—leading to segmentation into units—would also naturally lead to differentiation across those units, as well as a need for integrating mechanisms. Differentiation is primarily manifest in differences in managerial attitudes, work styles, goal orientations, and organizing structures such as formalization (Lawrence & Lorsch, 1967a; cf. March & Simon, 1958). These differences may impact what each unit views as appropriate or optimal in terms of business practices. For example, a sales group and a product development group in the same organization might have different perspectives on the appropriate features of a new product. Sales might prefer very complex features frequently requested by customers, while product development may find these unrealistic in practice, and propose more technically-feasible features. Conflicts such as these—the result of differentiated views—must be overcome through coordinating processes, or integration. Lawrence and Lorsch formally defined structural integration as the “collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment” (1967a: 11). While this may refer to the state of integration among units (i.e., how well they coordinate activities), it is also used to “describe both the process by which this state is achieved and the organizational devices used to achieve it” (Lawrence & Lorsch, 1967a: 11). In the example above, sales and product development must eventually come to an agreement on the product specifications through integrating mechanisms.⁶

⁶ Integration (as mechanisms) and differentiation are conceptually orthogonal constructs. Organizations can be highly differentiated and simultaneously tightly integrated, although the effectiveness of the integration may be lower with higher differentiation (Lawrence & Lorsch, 1967a). My primary emphasis is

The presence of such integrating mechanisms will generally correspond with interdependence and interconnectedness across sub-units of an organization. Thompson (1967) emphasized interdependence as critical aspect of complex organizations. He proposed a typology of interdependence including pooled, sequential, and reciprocal. *Pooled interdependence*, in which the performance of each unit contributes to the whole and therefore indirectly impacts the other, is the most basic. *Sequential interdependence* indicates a direct reliance of one unit upon the outputs of another unit. The most complex form, *reciprocal interdependence*, refers to situations in which two units produce outputs which are necessary inputs for one another and therefore both units are dependent on each other. Reciprocal interdependence is the most difficult to coordinate and manage, and requires complex integrating mechanisms to enable organizations to accomplish their objectives (Lawrence & Lorsch, 1967a: 54-56). Just as individual work units differ in their level of interdependence with other work units, the nature and extent of integrating structures will also differ across units and organizations. It is the impact of these structures on the behavior of nonmanagerial employees in the organization that is one focus of the research questions in this dissertation.

In the development of hypotheses below I focus on how structures affecting integration at the work-unit level influence the likelihood of individual innovation efforts among nonmanagerial employees. To provide a coherent framework for understanding the underlying mechanisms and provide a common logical thread through the arguments, I draw on theories of individual performance that consider *ability*, *motivation*, and *opportunity* as key determinants of behavior (Argote, McEvily, & Reagans, 2003; Bird, 1989; Mitchell & Larson, 1987; Thompson, 1967). *Motivation* can be influenced by individual dispositions or emotional states, as well as external factors such as social pressures or compensation systems (Amabile, 1988; Organ, 1990).

on the effects of integrating structures and systems within the organization, independent of differentiation, similar to the approach used by other researchers (cf. Amabile, 1988; Golden & Ma, 2003).

Ability reflects individual skills, as well as knowledge, information, and resources that enable initiative in a specific context. *Opportunity* reflects the presence of a need for change in the environment (Dutton, 1992; Kanter, 1988; Van de Ven, 1986), as well as the flexibility in the organization that would allow for change (Amabile, 1988). Thus, consideration of motivation, abilities, and opportunity provide a comprehensive framework of latent constructs to explain the proposed relationships outlined below.

When applying these logics to explain the possible effects of structural integration mechanisms, the paradoxical and conflicting influences become quite apparent. In arguing for a positive relationship between structural integration and an organization's ability to adapt to a changing environment, researchers have suggested that integration is a key determinant of ability and opportunity to change because it enables multiple components of the organization to change in unison (Ettlie & Reza, 1992; Gulati, Lawrence, & Puranam, 2005). Integration can create opportunities to effect change through enhancing information flows, interaction, and involvement.⁷ However, there are downside implications of integration mechanisms that may inhibit the abilities or motivation of individuals to engage in innovative or change oriented behavior. For example, the complexity of integrated processes that influence multiple units may discourage individual attempts to modify or alter work routines. Thus, dimensions of organizational structure and systems that lead to tighter integration may have conflicting effects on the likelihood of individual innovation efforts among employees through their differential impacts on motivation, ability, and opportunities.

⁷ Novel information may enable more useful or higher quality innovations, however it is also likely to influence the base rate of individual engagement in such efforts, whether well conceived or not. A complete lack of ideas is likely to make it difficult to conceive of potential changes. A larger supply of ideas and information from various sources is likely to increase the rate at which an individual will notice opportunities to do something in a different way and introduce change. This in turn will have a positive impact on the base rate of engagement in innovation efforts.

In selecting specific aspects of structural integration to consider, I incorporate earlier perspectives that emphasize intrafirm contexts, as well as more recent research that has considered interfirm integration (Barki & Pinsonneault, 2005). I consider structural integration not only between work units at equivalent hierarchical levels, but also extend this logic of integration in five areas described below that reflect distinct mechanisms that influence different dimensions of intra- and interfirm integration. Figure 3 provides an overview of these aspects of structural integration, and highlights the complementary nature among them. First, I consider *centralization*, or the degree to which decision making is conducted at higher levels of the organization, rather than being delegated to lower-level units. Centralized processes are an integrative planning mechanism designed to achieve greater coordination (Lawrence & Lorsch, 1967a). Thus, this dimension captures vertical integration or interdependence within the firm. *Cross-unit integration*, or the presence of mechanisms to coordinate the activities of units performing different functional or otherwise specialized tasks, reflects horizontal or lateral intrafirm integration. The level of *boundary spanning* activities for a unit addresses the degree to which interfirm integration is relevant to a unit's activities. The utilization of *nonstandard employment arrangements*, such as involvement of contract employees in order to accomplish the unit's primary work tasks, represents another form of interfirm integration—from the outside inward. Finally, I incorporate temporal integration by considering the nature of a work unit as either a *temporary or permanent* unit. Units that are established for a fixed duration or fixed lifetime, such as project-based groups, can be considered to be less integrated because they will not need to be integrated with the organization at some future point.

STRUCTURAL INTEGRATION HYPOTHESES

Centralization

One aspect of intrafirm integration is the degree to which the work objectives and processes of peripheral work units are determined by unit managers at lower levels, or by individuals or groups higher in the organization, or the level of centralization. Centralization of authority, including the implementation of hierarchical control systems, is one of the coordinating mechanisms proposed by Lawrence and Lorsch (1967b) as a means of achieving structural integration. Although organizations have tended to become decentralized in recent decades, many organizations still maintain highly centralized structures as mechanisms to manage complexity and coordination (Chesbrough & Teece, 2002).

A highly centralized organizational structure may inhibit individual innovation efforts for a number of reasons. Centralization is likely to shift burden of change initiation toward upper-levels of the organization (Fredrickson, 1986), which will obscure the role of individuals in influencing the overall success of the firm (Bartlett & Ghoshal, 1996) and decrease the level of felt-responsibility at the unit level and among nonmanagerial individuals. Because of the implicit bias toward top-down directives, centralization also tends to reduce the availability of upward feedback and information mechanisms and reduce the likelihood of information flows that contradict existing centralized policies (Morrison & Milliken, 2000). It also fosters isolation and decreased cross-unit interaction within the organization (Miller, 1987). These limitations on the availability of information and awareness tend to reduce individual motivation and ability to become involved in processes beyond fulfilling the specific job duties (Damanpour, 1996a).

Decentralization enables local units to pursue independent projects and activities, without reliance on individuals higher in the firm's hierarchy for direction (Burgelman, 1983a, 1983b; Quinn, 1979). This local freedom to innovate and adapt practices, due to decreased oversight,

may lead to a local-unit culture less dominated by a commitment to organizational processes or strategies and foster a climate that motivates nonmanagerial employees to contribute to change (Barringer & Bluedorn, 1999). In addition, because a decentralized structure fosters organizational flexibility by dispersing power throughout the organization (Damanpour, 1996b) this structure may also provide a greater number of individuals the opportunity to engage in innovation efforts. Furthermore, decentralization is also more likely to enable knowledge transfer among organizational units because it encourages the development of lateral (cross-functional or cross-unit) ties (Inkpen & Tsang, 2005; Aiken & Hage, 1971). It also increases the variety and frequency of communication (Barry & Crant, 2000). These information flows may have a positive enabling effect by alerting individuals to potential problems that they may be able to solve, or by providing novel ideas that could be implemented within the local workgroup. Thus, I propose the following hypothesis, reflecting the above logic:

H1: The lower the degree of centralization within the organization, the higher the likelihood of individual innovation efforts among nonmanagerial employees.

Cross-unit integration

Cross-unit coordination is a second key mechanism proposed by Lawrence and Lorsch (1967b: 12) to achieve structural integration. As opposed to centralization, this approach reflects lateral integration within the organization. On this dimension, there are strong competing arguments regarding the effects of such structures.

Interdependence among organizational units (Thompson, 1967), described above, creates requirements for coordination and integration. Cross-unit integration devices, such as joint decision-making policies, coordinating meetings, cross-department committees, or formal liaison positions (Miller, 1987; Birkenshaw et al., 2002) are implemented because changes in one area

will influence the actions or outputs of another in significant ways (Dougherty, 2001). This reality, and the mechanisms to address such challenges, may potentially undermine the ability of individuals to initiate changes in one area of the organization at lower levels. For example, individuals must understand constraints in other departments and anticipate others' problems in the process of adjusting internal processes within their workgroup (Clark & Fujimoto, 1991; Dougherty, 2001). Higher levels of integration can also increase planning complexity, role ambiguity, and interorganizational conflict, with the potential to overload and stress employees (Joyce, McGee, & Slocum, 1997; Sorenson, 2003). Furthermore, the absence of market mechanisms to resolve differences between units may lead to inefficiencies and politicize the coordination process (Kouvelis & Lariviere, 2000). The additional effort required to accomplish coordination activities (e.g., cross-functional meetings) may also decrease motivation, or create roadblocks that inhibit the ability to demonstrate individual innovation efforts. Consistent with this view, Weick (1976) suggested that organizational entities that are not tightly connected with other units are more adaptive because they are less constrained by the overall organizational system.

Despite these potential impediments created by cross-unit integration, there are a number of beneficial aspects that are likely to foster individual innovation efforts. Cross-unit or cross-functional integration may lead to greater awareness of problems and opportunities throughout the organization. Cross-unit connections have been found to encourage joint problem solving and cross-learning of both explicit and tacit knowledge (Zahra & Nielsen, 2002). This exchange of novel information with others outside the local group is also a critical enabler of creative thinking in organizational contexts (Brophy, 1998). For example, the awareness of interconnections between local activities and activities elsewhere in organization may motivate broader thinking about the appropriateness of routines and activities. It has been suggested that as individuals

across differentiated subunits come together, they increase the overall depth of knowledge within the organization which, in turn, can stimulate development of new ideas (Aiken & Hage, 1971; Damanpour, 1996b). Evidence of positive effects on innovation at the organizational level (Koberg, Detienne, & Heppard, 2003) and the group level (Ancona & Caldwell, 1992) support this idea the intrafirm integration across units and functions is potentially beneficial. Although these studies consider the implementation of innovations, and not the original efforts that led to such innovations, one explanation for this positive relationship is that the integration increases the rate of innovation attempts by motivating or enabling such efforts. Transfer of ideas across functional areas may also provide innovative ideas necessary for individual initiatives to bring about change. Thus, we may expect a similar effect at the individual level when examining innovation efforts among lower-level employees. The arguments above imply that cross-unit integration may lead to better, more useful ideas. Although this may be true, the critical effect in this case is the enabling of efforts, through more frequent awareness opportunities to engage in innovation.

It is possible that the detrimental effects of constraint and complexity suggested above may only appear at very high levels of cross-unit integration (i.e., coordination with a large number of other units, or coordination across many processes). These constraining effects are likely to be much stronger than the informational benefits at this level, leading to a negative relationship at the high-end of the range of cross-unit integration. On the other hand, the freedom from constraints in a working unit independent from other units is unlikely by itself to foster greater innovation efforts. The motivational effects and triggering of improvement ideas through integration are necessary to foster innovation efforts. At modest levels of integration, these effects are likely to be most influential, without the downside of constraints associated with high levels of integration. This is consistent with notions that intermediate levels of connectedness

will produce the greatest quality of knowledge flows (Hansen, 1999). However, at low levels of cross-unit integration, units may suffer on average from a decreased flow of knowledge and ideas, leading to reduced motivation to engage in innovation efforts or less frequent recognition of opportunities to innovate. This results in a negative relationship as integration falls below some modest level. In combination, these effects at low, medium, and high levels of cross-unit integration result in a combined prediction of an inverted U-shaped curvilinear relationship:

H2: The level of cross-unit integration will have an inverted U-shaped relationship with individual innovation efforts among nonmanagerial employees, such that in contexts with moderate levels of cross-unit integration the likelihood of innovation efforts will be highest.

External boundary spanning

Boundary spanning activities (Thompson, 1967; Leifer & Huber, 1977) serve as integrating mechanisms between a focal organization and external stakeholders such as suppliers, customers, or other strategic partners. These activities are necessary to overcome the interorganizational differences in areas such as goals, processes, and culture (Lawrence & Lorsch, 1967a; Johnson, 2004).

Since external change is a primary driver of the need for internal change and learning, workgroups with higher levels of boundary spanning activities may provide an environment in which employees are highly motivated to initiate change. On one hand, excessive reliance upon information from within the organization reinforces prior precedent which may be inappropriate as external markets change (Haas & Hansen, 2005). On the other hand, the more open an organization is to the external environment, the higher the likelihood that members will be exposed to conflicting views regarding what actions are appropriate or necessary (Coopey,

Keegan, & Emler, 1998; Yli-Renko, Autio, & Sapienza, 2001; Inkpen & Tsang, 2005). Such awareness may motivate beneficial organizational change. For example, boundary spanning activities, such as communication and coordination with suppliers, meetings with key customers, or membership in industry alliance groups, can help organizations overcome commitment to existing processes or strategies by increasing the awareness of potential problems or opportunities that may motivate change. Among nonmanagerial employees, even those not directly in a boundary spanning position, boundary spanning connections at the workgroup level are likely to create a more flexible, adaptive culture and orientation of the workgroup. This is likely because the supportiveness of an organization for change and innovation is heavily influenced by the attitudes and willingness of managers to consider and support change (Scott & Bruce, 1994). Thus, as managers engage in boundary spanning activities and become more motivated to pursue or foster change, this will have spillover effects within the unit that may increase the level of individual motivation to engage in innovation efforts.

External contacts also provide a potentially rich source of novel ideas that can be incorporated into existing organizational routines or strategies. As such, individuals performing boundary spanning activities also play a central part in the internal decision making of work units because of the potential value of their unique knowledge (Tushman & Romanelli, 1983). For example, cross-organizational involvement of managers in acquired firms who remain during implementation provide a critical source of serendipitous value for firms as they draw upon their unique knowledge and apply it in a novel setting (Graebner, 2004). Hargadon and Sutton's (1997) study of the product development firm IDEO is also an excellent example of the benefits of exposure to information in a variety of contexts, and its novel application in the solution of a problem in an unrelated domain. Individuals in more traditional organizational spanning roles may identify ideas or knowledge that could be applied internally. Although this knowledge is

most likely to benefit the boundary spanning individuals, to the extent that there is knowledge spillover to other members of the work unit, the entire workgroup may benefit from an increased ability to engage in individual innovation efforts. Once again, while this information may enhance the quality of the innovation efforts, it is also likely to increase the frequency of such efforts by creating an environment in which there is greater awareness of opportunities to innovate, and in which there are simply more raw ideas available to trigger innovation. Combined, the above arguments lead to the following hypothesis:⁸

H3: Higher levels of boundary spanning activities among workgroup members (i.e., contacts with suppliers, customers, or other stakeholders) will increase the likelihood of individual innovation efforts among nonmanagerial employees.

Contract employment arrangements

A structural adaptation with implications for interorganizational integration that has become increasingly popular is the use of nonstandard employment arrangements to accomplish core and non-core organizational tasks. For example, contractors, consultants, or temporary workers may play a role ranging from minor contribution for a limited time period, to being the dominant class of employee within a unit.⁹

Matusik and Hill (1998) have theorized that such workers are a valuable source of innovation and learning by bringing in novel information from outside the organization. The potentially fluid nature of information flows through organizational boundaries via contract workers is reinforced by empirical evidence of the potential risk of information expropriation by

⁸ Because these boundary spanning relationships are likely to be weaker and require less complex integration than intrafirm cross-unit relationships, a high degree of external boundary spanning is less likely to create rigidity that inhibits change. Thus I hypothesize only a linear positive relationship.

⁹ Two important types of nonstandard work arrangements are temporary and contract employment (Davis-Blake, Broschak, & George, 2003), although part-time work and other arrangements may also be classified as nonstandard. For the purposes of this study, the most relevant type of arrangement is the use of contractors, such consultants or contract project managers.

contract employees as well (Mayer & Nickerson, 2005). In the examination of individual innovation efforts, however, these informational flow effects are expected to be generally positive. In addition, the presence of quasi-insiders in the workgroup may have the tendency of weakening in-group biases (Hogg & Terry, 2000), and thus foster flexibility within the work unit. The increased level of turnover often associated with nonstandard employees may also increase levels of experimentation and variance (Matusik and Hill, 1998; March, 1991). All of these factors are likely to enhance the likelihood of individual innovation efforts. The lower level of overall commitment to organizational routines, plus the varied experience and ideas coincident with outsider status, may create an environment in which individuals are more secure and able to initiating changes.

A limiting factor associated with contract employment, however, is lower levels of organizational identification and commitment. Blended employment arrangements decrease the quality of manager-employee relations, and the mixing of temporary employees specifically can decrease the levels of loyalty increase the likelihood of exit, as well as voice (i.e., desire to unionize) (Davis-Blake, Broschak, & George, 2003). Although such behaviors are not directly related to individual innovation efforts, to the extent that decreased loyalty or quality of relations undermines the motivation to engage in innovation, such arrangements could have negative effects. Contingent workers may also have lower baseline levels of organizational commitment and demonstrate lower levels of OCB, although these effects can be overcome to the extent that nonstandard employees do develop a positive sense of organizational identification (Van Dyne & Ang, 1998). These factors may decrease the motivation to initiate change or share unique knowledge, and reduce interaction among workgroup members.

Since it is likely that both fostering and inhibiting processes outlined above will operate in determining the relationship between integration of non-standard employees and the level of

individual innovation efforts, it is important to consider the combined effect at different levels of non-standard employment. As organizations move from zero contract or temporary employees to modest levels, they are likely to get the greatest gain from novel information from outside sources. Furthermore, the indirect effects of weakening social cohesion among the group moderately may reduce commitment to status quo. In combination, these effects suggest that moving from very low to modest levels will foster innovation efforts. The decreased motivation and loyalty associated with contract employees is only likely to appear as units move above modest levels of contract employment to very high levels (or complete reliance on contract employees). In cases where many or almost all employees are contract employees, the novel information benefits may be irrelevant because social cohesion and commitment are so low that individuals are unmotivated to share information. Combined with the direct effect of reduced motivation and loyalty, higher levels of temporary or contract employment exceeding some modest level are likely to decrease the likelihood of innovation efforts. In combination, these arguments suggest a curvilinear relationship as hypothesized below:

H4: The level of nonstandard employment within a workgroup will have an inverted U-shaped relationship with the likelihood of individual innovation efforts among nonmanagerial employees (not hired as contractors), such that the likelihood of innovation efforts will be highest with moderate levels of contract employment.

Temporary vs. permanent workgroups

Temporary organizational units, not a part of the formalized permanent structure of an organization, are another mechanism with implications for integration. These units “provide a sensible mechanism for adaptation which allows learning without seriously disrupting the organization” (MacKenzie, 1986). They do so, for example, by allowing experimentation with

task processes while maintaining independence from the formal organizational architecture. Although many groups will eventually dissolve once the specific task has been accomplished, in other cases they will be integrated at a later point, but during the primary stage of activity they are explicitly outside the permanent organizational structure (MacKenzie, 1986), and are thus less structurally integrated.

As such, workgroups with a fixed lifespan to end with the completion of a given project or task may create an environment less tightly coupled to the norms at the organizational core. Such an argument is often made explicit as a justification for such units. Temporary workgroups are assumed to enhance flexibility and adaptability because they are not intended to permanently integrate with the formal organization (Grabowski & Roberts, 1999). Such a structure is likely to create a context in which employees are free to suggest and implement changes without concerns for disrupting the status quo. In addition, the involvement of individuals from various groups and functional areas with differing experience—all with relatively low workgroup tenure—may increase openness to change efforts.

However, status as a temporary group may decrease the motivation for change efforts. Individual innovation efforts may not be perceived as worthwhile considering the likelihood that the impact may only be short-term (until the end of the project). Individuals may prefer to focus on efficient execution of the primary task, particularly if the temporary nature of the workgroup creates added time pressures that limit the time available for experimentation and development of new ideas. As a result, they may be less willing to pursue process or strategy innovations.

Thus, temporary workgroup structures may facilitate individual innovation efforts by increasing the opportunity (through greater flexibility), but at the same time may inhibit individual innovation efforts through decreased motivation. Because there is no a priori reason to

expect one or the other to dominate, and given the binary nature of temporary status, I propose the following competing hypotheses:

H5a: The likelihood of individual innovation efforts among nonmanagerial employees will be *higher* in nonpermanent workgroups.

H5b: The likelihood of individual innovation efforts among nonmanagerial employees will be *lower* in nonpermanent workgroups.

SOCIAL INTEGRATION

Similar to structural integration, which reflects the degree to which organization units are interconnected, social integration reflects the degree to which an individual is linked to others within a group (O'Reilly, Caldwell & Barnett, 1989). Key components include outward indicators such as the level of interaction and coordination of activities among group members, as well as less-observable “feelings of attachment and inclusion” within a workgroup (Morrison, 2002: 1154). The level of social integration—in part a product of the mechanisms and structures in a work unit that lead to such social connectedness—may have both detrimental and beneficial effects on innovation efforts among nonmanagerial employees. I will first provide an overview of social integration processes, and then consider general arguments regarding the impact of organizational determinants of social integration on individual attempts to innovate using the previously introduced logic of motivation, ability, and opportunity. Subsequently, I will develop specific hypotheses that address the effects of distinct structural determinants of social integration on the likelihood of individual innovation efforts.

Constraining effects of social integration

Social integration emerges through formal and informal socialization processes within a work unit—the primary reference group for an employee (Falcione & Wilson, 1988; Charles,

1981; Louis, 1980). Lewis and Seibold (1993: 340) defined socialization as “the process by which an individual acquires an appropriate set of role behaviors and learns the norms, values, and social knowledge necessary for adopting a role in an organizational setting (cf. Falcione & Wilson, 1988; Charles, 1981; Louis, 1980). This process enables coordination among members of the workgroup by facilitating necessary information flows and reinforcing consensus views among group members (Jablin & Sussman, 1983). Thus, as individuals become more socially integrated, through socialization mechanisms, they develop a greater understanding of and are more likely to conform to role expectations and group norms. Salancick and Pfeffer (1978: 233) argued similarly that the “social context binds people to behavior through a process of commitment, affects the saliency of information about their past activities and provides norms and expectations that constrain their rationalization or justification of those activities.”

Although such social integration may be beneficial for unit productivity and in-role performance (Ouchi, 1980; Podsakoff, Mackenzie & Ahearne, 1997; Smith et al. 1994), it likely inhibits individual innovation efforts through fostering homogeneity and acceptance of existing practices in the organization. For example, many models of organizational socialization adopt a sensemaking perspective (Weick, 1995), in which the individual is acculturated through a sensegiving process. These models emphasize ends such as role clarification, loyalty, and acceptance of and commitment to organizational objectives and norms, including overcoming any individual resistance or desire to change organizational norms (Feldman, 1976; Buchanan, 1974; Schein, 1978; Wanous, 1992; cf. Wanous, Reichers, & Malik, 1984). Building on this perspective, researchers have suggested that high-levels of sensegiving result in very consistent actions across organizational members (Maitlis, 2005), while on the other hand, less coherent socialization processes lead to greater variance in perceptions, attitudes, and behaviors among employees (Lewis & Seibold, 1993). This link between social integration processes and

cognitions, attitudes, and values, suggested by earlier researchers (Frese, 1982), has been explicitly proposed to influence the level of individual initiative (Frese, Kring, Soose, & Zempel, 1996). Consistent with March's (1991) views, the weight of argument suggests that being quickly and strongly integrated into a group may limit exploratory behavior that could provide beneficial variation and change.

This general proposition does have some empirical support as well, which highlights some of the specific mechanisms by which social integration inhibits exploration type behaviors. Building on the early findings that social cohesiveness leads to greater conformity (Hackman, 1976; Lott & Lott, 1965), more recent research has shown that the increased peer surveillance of activities, for example, leads to stricter adherence to policies and procedures (Sewell, 1998). In a more subtle, but equally important manner, social integration can lead to especially powerful social learning through the modeling of others' behavior in the work environment. Social learning through modeling is particularly influential because implicit task-specific processes and outcomes are more readily observable, and learners view the learning as more relevant than lecture or reading materials (Callahan, Kiker, & Cross, 2003).

Both surveillance and social learning, enhanced by integration, can reinforce commitment to common goals and routines among the work unit members. Alignment of individuals' goals with group goals does have a strong relationship with the quality of in-role performance (Crown & Rosse, 1995), however this emphasis on doing a specific job according to the group norms may lead to an emphasis on conformity as the goal, rather than efficiency (which may motivate search for alternative methods or strategies). In addition, employees may come to value organizationally defensive routines (Argyris, 1994) that inhibit the free flow of divergent ideas or actions, and inhibit learning and exploration.

This commitment to routines may inhibit the willingness of low-level supervisors and employees to share negative information or suggest the need for change (Argyris, 1994). This is consistent with notions of pluralistic ignorance (Westphal & Bednar, 2005) and other well documented social psychological phenomenon whereby individuals will go along with a position they disagree with simply because they believe the majority of others hold an opinion contrary theirs (Asch, 1955). These processes tend to reinforce conformity and suppress attempts to make changes counter to the perceived majority opinion, which would severely undermine the individual motivation to engage in individual innovation efforts.

In addition to these strong negative effects on motivation, strong social integration may also inhibit the ability of employees to even conceive of novel ways to change routines. Given the relative difficulty of allocating attention to nonroutine processes or events in a work environment (Van de Ven, 1986), higher levels of integration will further hinder such attention and enlarge the cognitive blinders that prevent individuals from identifying novel information or change opportunities. This is consistent with the propositions that rigid rules and authority discourage generation of new ideas (Pierce & Delbecq, 1977) and that too much knowledge about a given domain can constrain individuals' abilities to consider divergent ideas from different domains (Mumford & Gustafson, 1998; Perry-Smith & Shalley, 2003; Simonton, 1999). Thus social integration, particularly at high levels, is likely to inhibit individual innovation efforts among employees. Nevertheless, there are a number of potential benefits of some level of social integration in terms of enabling individual innovation efforts.

Enabling effects of social integration

In contrast to the above logic, higher levels of social integration have been argued to positively affect organizational involvement and motivation (Katz, 1964; Katz & Kahn, 1978;

Moch, 1980). For example, Katz (1964) argued that social integration would enhance individuals' abilities to understand their contribution to group performance, and feel a greater sense of duty toward the group. This sense of shared involvement can have a motivating effect because individuals will more likely perceive their own positive impact on the outcomes of other individuals (Moch, 1980). Similarly, to the extent that social integration leads to shared identity, collective ambition, and a sense of personal impact, it can be a significant motivating force for extra-role efforts (Ghoshal & Bartlett, 1994). For example, employees' attraction to and trust in their peers leads to higher levels of OCB (Chattopadhyay, 1999), and others have found a direct relationship between cohesiveness and OCBs such as courtesy (Kidwell, Mossholder, & Bennett, 1997). This same relationship may also hold for behaviors such as individual innovation efforts where an individual's desire to act in a way that will have organizational benefits is critical.

The enhanced trust and motivational effects resulting from a sense of social integration may also foster knowledge sharing among individuals in a workgroup (Reagans & McEvily, 2003). The implications for individual innovation efforts include awareness of problems or opportunities that may prompt change or innovation attempts, as well as access to information or other resources that may be valuable in the process of selling or implementing a change. Because such knowledge sharing is essential to foster individual innovation activities, social integration thus provides an enabling role by enhancing the ability of employees to conceive of and develop innovative ideas. In examining related domains, researchers have found that increased collaboration and social interaction can make attempts to innovate within the organization (i.e., organizational improvisation) more effective, constructive and relevant (Vera & Crossan, 2005).

The interpersonal connections of social integration may assist in the development of upward organizational ties, which can prove valuable as employees attempt to gain the attention of managers in order to acquire resources or promote a change or innovation (cf. Dutton &

Ashford, 1993; Fidler & Johnson, 1984), or to gauge the appropriateness of innovation efforts (cf. Dutton, Ashford, O'Neill, Hayes, & Wierba, 1997). It is also possible the understanding of organizational practices and norms that result from more thorough social integration may be a critical foundation for individual innovation efforts. Consistent with the notion of absorptive capacity (Cohen & Levinthal, 1990), if the ability to integrate and adopt novel ideas is dependent on current levels of knowledge and understanding, the improved understanding will further enable change efforts.

These supportive mechanisms resulting from social integration, in combination with the processes described above, suggest a middle-ground, where a certain level of social integration is necessary in order to communicate in terms that the group will understand and view as valid, yet at the same time feel free to disagree with current ideas or practices. This is consistent with the Fiol's (1994) proposition that organizational learning requires both shared understanding and the ability to disagree on fundamental issues, while still being able to understand one another. As Hackman and Oldham (1976) suggested, some level of autonomy, enabled by the ability to operate independently from others, creates a beneficial sense individual responsibility and thus internal motivation. Similar to findings of a curvilinear relationship between individual interdependence and team performance (Stewart & Barrick, 2000), we may expect to find a similar relationship with individual innovation efforts. An intermediate level of structure and freedom enable experimentation and exploration necessary to innovate (Brown & Eisenhardt, 1997).

Below I examine four specific organizational structural characteristics that influence the level of social integration as well as the specific nature of that integration, and develop arguments specific to each regarding their influence upon individual innovation efforts. The four constructs include work geographic dispersion, decision-process involvement, workplace network size, and

functional diversity in workplace networks. As with structural integration, I have selected theoretically relevant dimensions that are important potential indicators of social integration. Figure 4 provides an overview of the areas that will be addressed in the hypotheses below.

SOCIAL INTEGRATION HYPOTHESES

Geographic dispersion

Geographic dispersion, often associated with “virtual work” arrangements or spatially separated workgroups, influences the amount of time individuals spend working together or apart (Griffith & Neale, 2001), and therefore is a key determinant of social integration. The effects of dispersion—and the associated lower-levels of integration—on individual innovation efforts are likely to be mixed, and depend on the degree to which groups are spatially separated.

The positive effects on individual innovation efforts are primarily a function of increased diversity of information and behavioral variation enabled through autonomy. Because geographic dispersion tends to reduce the level of supervisory oversight and control (Kurland & Egan, 1999) and increase independence and isolation (Wiesenfeld, Raghuram & Garud, 2001), individuals are enabled to vary their work practices and routines, either intentionally or randomly. Similarly, a lower degree of intrusions in a geographically dispersed work environment enables higher levels of concentration and productivity on tasks requiring creativity (Shalley, Zhou, & Oldham, 2004). Empirical research has also demonstrated that the autonomy, enabled by reduced managerial oversight, is predictive of greater organizational learning driven by exploratory behaviors (McGrath, 2001). In the opposite environment, where proximity is high, direct observation leads to more powerful social learning (Nadler, Thompson, & Van Boven, 2003), which may reinforce the commitment to existing processes and discourage change.

Consistent with this observation, dispersion has been proposed to lead to greater value diversity and informational diversity, as well as higher levels of task uncertainty (Griffith & Neale, 2001). To the extent that this increases the likelihood of divergent thinking, this variation will also increase the likelihood that initiatives aimed at introducing change or innovations will emerge. Griffith and Neale (2001: 407) also proposed that greater dispersion may in fact lead to a false sense among individuals that the group as a whole is very homogenous. This effect, resulting from a fewer rich interpersonal cues that might highlight different perspectives, may increase an individual's confidence that a novel idea he or she has developed will be valued across the group.

In contrast to these arguments, however, there are also aspects of less-dispersed work environments that are likely to foster individual innovation efforts. For example, physical proximity increases interaction opportunities, and thus increases awareness of problems and opportunities, and enables more frequent sharing and testing of ideas. Proximity also provides people with the opportunity to learn who knows what, so members know where to search for relevant knowledge and information (Borgatti and Cross 2003), which may be critical in the development of innovative ideas. Additionally, in field settings with high dispersion, a number of potential information flow impediments have been observed, including difficulties in communicating contextual information, difficulty in understanding the salience of information, and uneven distribution of information (Cramton, 2001). Furthermore, trust—necessary for the effective exchange of rich knowledge—can be difficult to establish and maintain among employees who are physically separated from one another (Jarvenpaa & Leidner, 1999; Kasper-Fuehrer & Ashkanasy, 2001; Wiesenfeld, Raghuram & Garud, 1999).

In addition to the informational benefits that enable individual innovation efforts, lower levels of dispersion may provide motivational benefits as well. Geographically dispersed units do

not tend to create a strong sense of identification due to the lack of face-to-face interaction and shared physical contexts (Fiol & O'Connor, 2005; Griffith & Neale, 2001). Because individual interdependence with group members increases the level of felt responsibility (George & Jones, 1997; Pearce & Gregersen, 1991), a more proximate setting may motivate employees to engage in attempts to innovate. Others have found that group cohesiveness encourages organizationally beneficial behaviors (Podsakoff et al., 2000). Similarly, this may also be expected to motivate individual innovation efforts. Empirical studies have also found higher levels of task, process, and affective conflict with greater geographic dispersion (Hinds & Bailey, 2003). Although some conflict is beneficial, high levels of conflict in dispersed environments may undermine the motivation of individuals to engage in innovation, especially to the extent that the benefits would extend to the larger group.

Building on the above arguments, I propose a curvilinear relationship between geographic dispersion and the likelihood of innovation efforts. Because workgroups that are entirely co-located and work in close proximity are likely to have the highest levels of social integration, with its potential negative effects of overly strong social learning, and because complete geographic dispersion will have significant negative motivational or information implications, I expect individual innovation efforts to be the greatest in a mixed environment. This is formalized as follows:

H6: Geographic dispersion will have a curvilinear, inverted U-shaped relationship with the likelihood of individual innovation efforts, such that the likelihood of innovation efforts among nonmanagerial employees will be lowest in groups with no dispersion, or groups that are highly dispersed.

Decision-process involvement

The level of individual involvement in decision-making processes within the unit reflects an additional aspect of social integration of employees within the unit. Process involvement—incorporated from procedural justice perspectives—affects the integration between lower- and higher-level individuals within a unit, and is therefore also likely to influence the level of innovation efforts within the workgroup. There are three components of process involvement. First, involvement reflects the engagement of the individual in the process by seeking input and allowing individuals to comment on the quality of ideas and opinions (Folger & Konovsky, 1989). Second, involvement is demonstrated when decision makers share their reasoning or explanations for decisions with all group members (Bies & Shapiro, 1988; Folger & Konovsky, 1989). Finally, involvement includes the setting and communication of clear objectives and performance expectations (Folger & Konovsky, 1989; Kim & Mauborgne, 1997). These factors, in combination, have been shown to increase the willingness of individuals to make voluntary contributions during strategic decision processes, however when these are not present individuals tend to hoard ideas and are unwilling to make extra efforts to influence the strategic direction of the group (Kim & Mauborgne, 1998). Thus, higher levels of involvement are likely to foster integration, as well as individual innovation efforts through improved information flow from multiple perspectives (Daft & Lengel, 1986).

Involvement is also likely to serve as a motivator for behaviors such as attempts to innovate. At the most basic level, process involvement including clarification and feedback seeking tends to encourage the sharing individual creative ideas (Taggar, 2002). Involvement has also been argued to make outcomes and the causal relationships more transparent (Ghoshal & Bartlett, 1994), which may enable nonmanagerial employees to feel more confident in their abilities to initiate changes. Related empirical evidence has shown that participatory processes

can influence creativity at the team-level (Gilson & Shalley, 2004) or entrepreneurial orientation at the firm level (Barringer & Bluedorn, 1999). This relationship is also likely to be manifest at the individual level when considering innovation efforts.

Although there may be some effects of decision involvement that hinder individual innovation efforts, such as more rigid role perceptions (Morris, Steers & Koch, 1979), or increased commitment to existing strategies and routines, because process involvement implies flexibility (Damanpour, 1996b), the downside effects are not as likely to hinder individual innovation efforts even with high levels of decision-process involvement. Therefore, I propose the following hypothesis:

H7: Higher levels of decision-process involvement will increase the likelihood of individual innovation efforts among nonmanagerial employees.

Individual Workplace Network Characteristics

Given the definition of social integration as the degree to which an individual is linked to others within a group (O'Reilly, Caldwell & Barnett, 1989), one way in which it should be manifested is in the workplace social networks of employees. This is consistent with the views that relationship building is an important mechanism by which individuals achieve social integration (Wanberg & Kammeyer-Mueller, 2000). Building on the logic of the general relationship between social integration and innovation proposed above, the following two hypotheses address the link between social-network characteristics—as more direct indicators of integration—and individual innovation efforts.

Researchers have found that workplace social network differences among low-level employees influence important outcomes such as income differences (Carroll & Teo, 1996). Recent conceptual efforts have suggested the importance of social network structures, including

tie strength, centrality, and network size, in determining individual levels of creativity or innovation (Perry-Smith & Shalley, 2003). Prior research also suggested that network position (i.e., centrality) may determine individual involvement in innovative activities (administrative or technical) (Ibarra, 1993) similar to individual innovation efforts. For the purpose of this dissertation, the most relevant network attributes are those that influence the availability of information and resources, or that may constrain individual action. This approach is consistent with prior studies have demonstrated that social networks enable middle- and upper-level managers to identify promising innovations and ideas (Howell, 2005; Howell, & Higgins, 1990). I propose that this relationship between network characteristics and information flow will hold at nonmanagerial levels as well; large, diverse networks should provide unique informational benefits as well as resources and support for innovation (Coopey, Keegan, & Emler, 1998). However, certain network characteristics, such as greater homogeneity, may have negative effects on motivation for individual innovation efforts because individuals will be less likely to raise divergent perspectives. The following hypotheses consider two ego-network attributes: network size, and network diversity.

Ego network size¹⁰

A larger network is likely to provide access to more information about problems or opportunities that may trigger individual innovation efforts, as well as greater potential personal influence to bring about change. Consistent with this informational perspective, informational network size has been associated with greater levels of organizational knowledge, as well as mastery of role tasks (Morrison, 2002). To the extent that larger networks a high proportion of

¹⁰ In considering size, a logical extension suggested by the propositions of Perry-Smith and Shalley (2003) is the strength of ties. Although tie strength and network size are likely negatively correlated, considering the interaction of the two may provide additional insights. For example, a relatively large network of strong ties may be more detrimental to individual innovation efforts than a similarly large network of weaker ties.

bridging, or weak ties, these networks are likely to provide valuable information (Granovetter, 1973). Social connectedness is also generally assumed to benefit innovation up to a point through improved information flows (Burt, 2004; Reagans & McEvily, 2003). Extensive social networks also contribute an employee's social capital and reputation (Burt, 1997), which may provide critical support to individuals who engage in individual innovation efforts. Thus, larger networks that result from social integration processes may serve "as a conduit through which employees are able to pursue proactive behaviors within the organization" (Thompson, 2005: 1013).

However, because non-supervisors (i.e., peers) tend to be the dominant source of normative and social information, particularly for newcomers to organizations (Morrison, 1993a), and because a large network is likely to include a higher ratio of non-supervisory relationships, a larger network may lead to stronger socialization to organizational norms. Larger workplace networks may also be positively associated with greater ego network density as well, to the extent that one individual's large number of ties is common across the workgroup. To the extent that this is the case, network size (through its association with a denser network) is likely to be associated with higher levels of role clarity (Morrison, 2002). Combined with theories suggesting that sparse networks (e.g., Mizruchi & Stearns, 2001) impose fewer constraints on the individual because alters are less likely to share a common perspective regarding the appropriateness of existing practices and routines, these also suggest that larger network size may constrain individual attempts to innovate. Thus a larger network may inhibit change efforts to the extent that individuals become more committed to existing routines and processes. A simpler causal inhibitor may be the time and effort necessary to maintain ties in a large network (Perry-Smith & Shalley, 2003), which would likely reduce the time available to engage in exploratory or innovative efforts. Given these arguments, I hypothesize the following curvilinear relationship:

H8: The size of an individual's workplace network will have an inverted U-shaped relationship with the likelihood of innovation efforts for that individual.

Ego network diversity

Ego network diversity in terms of alters' functional areas is predicted to increase the likelihood of individual innovation efforts. Greater diversity among an individual's alters will enable access to novel information that may be combined to produce valuable changes in the organization (Morrison, 2002; Almeida & Kogut, 1999; Song et al., 2003). In addition to the increased likelihood of obtaining non-redundant information from a more diverse network, diversity can help individuals overcome the conformity pressures of social integration and dense social network structures (Ruef, 2002). Ties to diverse knowledge pools in one's social network also increase an individual's ability to effectively convey complex ideas to diverse audiences (Reagans & McEvily, 2003). Such knowledge, plus the cognitive and behavioral flexibility required by greater network diversity, will contribute to an individual's ability to initiate change and innovation. These arguments suggest the following relationship:

H9: The greater the functional diversity of an individual's workplace network, the higher the likelihood of innovation efforts for that individual.

INTERACTIONS WITH INDIVIDUAL MOTIVATION & ABILITY

As discussed in the literature review, individual attributes are key determinants of individual initiative. It is possible that the general and specific effects of structural and social integration mechanisms may differentially influence individuals depending on their baseline tendency for proactive behavior or abilities. For example, Hackman and Oldham (1976) proposed that the effects of isolation are more likely to affect those with proactive personality traits, such as a growth orientation, and who are therefore more likely to be intrinsically

motivated. Similarly, individual experience and knowledge—both of which can enable individual innovation efforts—may influence the effectiveness of enabling factors in the organizational. Testing for such moderating effects provides additional insights into the boundary conditions and mechanisms by which these organizational factors influence individual innovation efforts. Below I develop hypotheses regarding the interaction between individual characteristics and structural and social integration factors. Although these individual characteristics may interact with many of the social and structural integration factors mentioned above, I select only two that are particularly likely to have moderating effects on the relationship between individual determinants and individual innovation effort: decision-process involvement and cross-unit integration.

Proactive personality

Proactive personality is a dispositional tendency to alter or effect change in one's environment (Bateman & Crant, 1993). Given the thorough validation of this measure (Bateman & Crant, 1993; Crant, 1995), and its strong conceptual similarity to individual innovation effort, I have selected this as the personality dimension of interest when considering interaction effects. Individuals with strong proactive personality tendencies may benefit more from isolation, and the latitude it provides for exploration. Because of their self-starting and intrinsically motivated nature (Crant, 1995; Thompson, 2005), they will not be limited by the lack of social integrating mechanisms, and proactively seek out ideas, resources, and attention. On the other hand, individuals without proactive personality traits would be unmotivated to initiate any change in a low social integration context. Speier and Frese (1997) found a similar interaction effect between self-efficacy and organizational control, such that low self-efficacy individuals demonstrated little

initiative when control was low, while high self-efficacy individuals demonstrated initiative regardless of the level of control.

When considering decision-process involvement as the social integration mechanism of interest, we might expect a similar interaction. An individual with a highly proactive personality may contribute through individual innovation efforts regardless of the level of involvement, while the low proactive-personality individual would only participate when enabled and motivated by higher levels of process involvement. This would lead to stronger relationship between process-involvement and individual innovation efforts for low proactive-personality individuals, as hypothesized below (see Figure 4 for a depiction of this prediction):

H10: Proactive personality will interact with decision-process involvement such that the level of involvement will increase innovation efforts among low proactive-personality individuals more than high proactive-personality individuals.

When considering proactive personality and structural integration of the workgroup within the larger organization as a whole, the opposite effect may be predicted. Structural integration mechanisms, as discussed earlier, can enable individual innovation efforts through presentation of novel information or greater awareness of opportunities, however it is unlikely to influence motivation. If we consider cross-unit integration, even at moderate or high levels of integration, the low proactive-personality employee will be unmotivated and therefore not engage in individual innovation efforts. The high proactive-personality individual will benefit from the ideas, opportunities, and resources and will be enabled to act on their intrinsic motivation and engage in individual innovation efforts. Thus, we might expect the following relationship (see Figure 5 for a depiction of this prediction):

H11: Proactive personality will interact with cross-unit integration such that higher levels of integration will increase the levels of innovation efforts for high proactive-personality individuals more than low proactive-personality individuals.

Breadth of experience

Similar to the individual differences in motivation, individual ability is likely to interact with social and structural integration mechanisms. Breadth of prior experience across functional areas, whether obtained through full- or part-time work or ongoing volunteer involvement in a student or community organization, is a key determinant of ability. This is because such breadth would contribute a diverse array of knowledge the individual could draw upon in formulating ideas for innovations within an organization. Similarly, the increased job-skills and experience would be expected to increase the perceived role-breadth (Morgeson, Delaney-Klinger, & Hemingway, 2005), which may motivate the individual to seek out and be more aware of opportunities for change in the organization.

Thus, an individual's breadth of experience could be expected to have a positive main effect on the likelihood of individual innovation efforts. This effect may differ, however, depending on the level of employee integration through decision-process involvement. An individual with more diverse experience is more likely to benefit from process involvement because of their greater ability to incorporate disparate information and facts, and consider situations from various perspectives. Decision-process involvement would also provide an opportunity for an individual to demonstrate his or her knowledge from various areas. Thus, experience may also increase an individual's credibility and persuasiveness as they engage in individual innovation efforts. Those with more limited experience, however, would be less likely to contribute, even when process involvement is encouraged, given their smaller bases of

knowledge and perhaps lower confidence in their own abilities. Building on this logic, I propose the following hypothesis (see Figure 6 for a depiction of this prediction):

H12: Individual breadth of experience will interact with decision-process involvement such that higher levels of involvement will increase the levels of innovation efforts for individuals with broad experience more than for individuals with limited experience.

In the case of work unit integration we may expect a similar pattern for individuals with broad experience. These individuals would be best able to take advantage of the diverse information that is made available through cross-unit integration. Furthermore, they would be most comfortable developing and proposing changes that may have implications beyond the local workgroup. For low-ability individuals, the opposite may be true. Their lack of experience and job-relevant knowledge will impede their ability to incorporate information from other parts of the organization. The added complexity of greater integration with the rest of the organization may further inhibit their confidence and ability to suggest or introduce changes within their own workgroup. Thus, we might expect opposite effects depending on breadth of experience, as follows (see Figure 7 for a depiction of this prediction):

H13: Breadth of experience will interact with cross-unit integration such that higher levels of integration will increase the levels of innovation efforts for individuals with broad experience and decrease the levels of innovation efforts for individuals with limited experience.

SUMMARY

In this chapter I have developed theoretically motivated hypotheses that explore how structural and social integrating mechanisms influence the likelihood of individual innovation

efforts. I have also briefly addressed the possible interaction between individual attributes and skills and the organizational mechanisms for social or structural integration. In the following chapter, I describe the research setting and the methodology used to test these predictions.

CHAPTER 4: RESEARCH METHODOLOGY

This chapter describes the methodology and research design used to test the hypotheses presented above. The sample, data collection procedures, and instruments are reviewed first, followed by detailed descriptions of the measurement and operationalization of the dependent, independent, and control variables. The chapter concludes with a discussion of the statistical procedures used to analyze the data.

SAMPLE & DATA COLLECTION

Internship Setting & Sample

Data for this study were collected from a sample of Masters of Business Administration (MBA) and undergraduate business students at the McCombs School of Business. The individual innovation efforts demonstrated by these individuals during their internships were the behavior of interest, and data for the dependent, independent, and control variables were obtained using surveys of interns, as well as their workplace supervisors.

The internship provides a novel setting well suited to the objectives of this dissertation, however it is useful to consider the specific strengths, and potential weaknesses of such a selection before proceeding. First, because interns work in a wide variety of organizations, from small startups, to large Fortune 500 organizations, and in a variety of industries and functional areas, this approach provides critical variance on the independent variables (structural and social integration determinants). Although the intern role is somewhat idiosyncratic, it overlaps conceptually with other traditional employment arrangements on critical dimensions. Interns fit the domain of interest given that their roles are typically nonmanagerial in part due to the finite duration of the work (typically between eight and twelve weeks). Although the internship is

technically a temporary work position, the interns' behaviors and perspectives are likely to be similar to new full-time permanent hires. This is because internships are largely viewed as the first step in obtaining a full-time job offer from the organization. Although not all interns obtain or even desire such an offer, it is likely in their interest to contribute as fully as possible to the organization in order to obtain positive references as well as experience that can enhance their ability to obtain a job with a different company.

A critical question, however, is whether interns can be expected to be both motivated and able to demonstrate individual innovation efforts. Graduate business interns typically have work experience prior to beginning their MBA program, and in the case of undergraduates, many have prior internship and work experience before completing their final internship for credit (the internship utilized for this study). Although interns may have somewhat limited work experience, they also bring the experience, perspectives and knowledge obtained in their courses. The McCombs guidelines for undergraduate internships, for example, state that "an internship is an educational employment position that allows students the opportunity to practice what they have learned in their academic classes." Internships are intended to both build on their knowledge, as well as expose them to new knowledge. Furthermore, recruiter guidelines make explicit the expectation that internships will provide meaningful work experience, beyond mundane administrative activities (i.e., copying and filing). Ideally, recruiters will also expect interns to contribute in meaningful ways, including through introduction of innovative ideas. For example, a Hewlett-Packard recruiting flyer posted at the McCombs school, under the banner heading "YOU will change the world," conveyed this idea in these terms: "You have ideas, and you're not afraid to use them. Which is just what we're looking for." HP's internship website reinforces this point, stating "Regardless of your background, if you have great ideas, in HP we will make sure you can develop them."

<http://h10055.www1.hp.com/jobsathp/content/informations/studentsgraduates.asp>) Although HP may represent a more supportive setting for innovation efforts than most (and use such marketing statements to foster positive affect among potential job candidates), it provides qualitative evidence that some firms anticipate self-starting, innovative behavior among interns. Based on direct communication with managers in organizations that recruit and supervise interns, the willingness and ability to demonstrate initiative is valued. Speaking of MBA interns, one director commented, “I absolutely want interns who demonstrate initiative. In fact, we try to give our interns ownership of specific projects in order to observe their ability to problem solve and drive a project. The best thing any employee can do for me is to give peace of mind that a problem will go away.”

Because interns typically begin an internship without prior experience in the organization where they will be working, this approach also controls for the effects of longer-term exposure to organizational culture and norms. (In the analyses I control for cases where the intern does have prior contact or experience in the company.) The lower levels of socialization to organizational norms that accompanies newcomer status may enable interns to more freely assess and comment on the effectiveness of an organization’s existing practices or strategies. Furthermore, interns, because they are employed for a limited period of time, are frequently assigned to tasks and projects of a nature that will allow them to acquire all necessary knowledge to contribute in a short period of time. This opportunity to get involved quickly and learn the details regarding a particular domain of the organization can enable individuals to suggest and implement changes. For example, a former undergraduate intern described a case in which she introduced a new analytical technique using Excel to more efficiently accomplish a task assigned by her supervisor. In presenting her deliverable, she described the new process to her supervisor, who was impressed by the potential benefits, and encouraged her to show others in the group how to use

this technique. MBA interns may be even more confident and motivated to demonstrate their unique skill and ability to contribute to an organization. Based on my own personal experience as an intern, and recruiter and supervisor of interns, MBA interns can be quite able and motivated to influence operating practices as well as business strategies (e.g., product or marketing strategies). As such, this setting was selected with confidence that individual innovation efforts would be observed during internships, at least among some subsample of the respondents (as the data show below). Although the base rate of innovation efforts for interns may differ from long-term employees or traditional new hires, this setting provides a useful opportunity to take the first step in understanding the effects of social and structural integration determinants on innovation behaviors at lower levels of organizations.

The names, demographic information, internship details, and contact information for all McCombs undergraduate and graduate interns during several semesters were obtained through the career services office (for MBAs) or the undergraduate program office. Undergraduates complete internships throughout the year, so the sample included internships outside summer semesters as well. Semesters included summer and fall of 2006, and spring and summer of 2007. Across these semesters, a total of 1,248 undergraduates and 433 MBA students comprised the sample (a total of 1681). Given the desire to obtain as many responses as possible, all interns during this period were contacted and invited to participate, rather than sampling from among these individuals. Data collection was accomplished using online web surveys, described in the following section.

Survey Instruments & Data Collection

Interns completed two separate surveys: one completed near the beginning of the internship, and a second completed after completion of the internship. Internship supervisors also

completed one survey, following the end of the internship. The online survey system, which I custom developed, utilized an individual access code to limit access to only selected participants, and also allowed the matching of responses to individual names. This prevented individuals from completing any survey more than once and also eliminated the need to re-enter personal information such as name or e-mail address. The surveys were hosted on the McCombs School research web servers at a McCombs URL to reinforce the legitimacy of the study.

The first intern survey collected personality measures, work and extracurricular experience data, demographic information, and several internship details (e.g., start and finish dates). (Detailed survey instruments are described in the variables section below, and excerpts of the actual survey are included in the Appendix. Full copies of the surveys are available upon request.) The second survey, administered just following the end of the internship, captured several job characteristic variables (e.g., autonomy), social network data for the intern, the primary dependent variable measure of individual innovation efforts, and contact information for the supervisor (for the MBAs). Satisfaction and other measures to be used for career services purposes were also included in this final internship survey.

The supervisor survey, also completed shortly following the end of the internship, was used to gather many of the primary independent variables (i.e., social and structural integration mechanisms) and organizational control variables (e.g., functional diversity and organizational age). This survey also included a general performance evaluation of the intern to be used for career services purposes outside the scope of this dissertation.

These separate surveys were utilized to avoid concerns regarding common method or common source bias. In addition to the survey data, archival data on the individuals and companies were included in the analyses. These include the industry, internship function, gender,

ethnicity, major area of study, and other measures described below. The contact and recruiting protocols for both interns and supervisors are discussed in the next section.

Recruiting Protocol & Response Rates

Participant recruiting was coordinated with the business school career services center and other representatives who oversee the undergraduate internship programs. Interns were invited to participate in the study near the start of their internship by an e-mail from an appropriate organizational sponsor (either the MBA career services director or the undergraduate advisor who coordinates internship activities). The invitation described the purpose of the study, the participation requirements, the benefits to the individual as well as the university (e.g., improved understanding of internship experiences), and incentives for those who complete the entire study. As an incentive, all interns were provided a personal report of their workplace personality profile as well as their internship experience (such as satisfaction). In addition, MBA interns were offered a low-value gift (a \$15 credit towards the purchase of McCombs or UT logo items such as t-shirts) and a entry in a lottery with the possibility of winning one of several cash prizes (either \$400 or \$200). Because the data collection was incorporated into the formal internship process for the undergraduates, such incentives were not needed. The voluntary nature of participation, and the confidentiality of all data collected were communicated as well. All introductory materials stated that the data was being collected for a dissertation research project, and included researcher contact information, as well as all necessary human-subjects disclosure as required by the university Institutional Review Board (IRB). All required IRB approvals were obtained prior to the start of data collection. After the initial communication two additional waves of follow-up invitations were sent. All messages contained a URL link and individual code to be used by the intern to access the online surveys (as described above).

Supervisors were identified using information supplied by the interns, including the name, title, and e-mail address of the supervisor. Undergraduates provide this information in the internship approval process, so supervisory information was available for all undergraduate interns. For MBAs this information was provided in the second intern survey. To avoid concerns about sharing this information, communication items indicated that supervisors would only be asked to fill out a brief, confidential survey with questions about several aspects of the organization and the experience of the intern. Because of the voluntary nature of providing the supervisor contact information, I did not have a matched supervisor for all interns (particularly with MBAs). The supervisors of undergraduates and MBAs (for whom information was available) were contacted via e-mail by the appropriate McCombs representative (MBA career services or undergraduate programs) inviting them to participate in a study of organizational factors that lead to successful internships. The communication protocol included necessary descriptions of the research effort and indications of confidentiality, as required by human-subjects protocols. As with the intern communications, two follow-up e-mail messages were sent (directly from me, rather than McCombs staff). In some cases, supervisors oversaw the work of more than one intern in the sample. In these cases, they were not required to fill out the survey multiple times. The responses to organizational questions, such as the level of centralization, were matched with all interns under their supervision.

Utilizing this protocol, 1,092 out of 1,681 interns (65% response rate) completed the initial survey (790 undergraduates, a 63% response rate, and 302 MBAs, a 70% response rate). A total of 795 (47% response rate) completed the second survey (574 undergraduates, a 46% response rate, and 221 MBAs, a 51% response rate). This drop-off from the first to the second

was expected, but still produced overall acceptable response rates.¹¹ Supervisor responses were somewhat more difficult to obtain. A total of 381 supervisors completed the supervisor survey with complete matched data from interns. Because some supervised more than one intern, these responses matched up with a total of 402 interns. These responses indicate a response rate of 51% of the matched supervisors contacted. Overall, when considering the full sample of 1681 interns, the complete matched responses of 402 represent an effective response rate of 24%.

VARIABLES & MEASUREMENT

In this section the specific measures and operationalizations of variables are described in detail. A summary list of variables is included in Table 4 as well.

Dependent Variable: Individual Innovation Effort

Individual innovation effort was measured in the survey administered shortly after the completion of the internship using a self-report instrument based on Morrison and Phelps (1999) “taking charge” measure. This well-validated multi-item measure provides a strong behavioral indicator of the level of individual innovation efforts in the process domain (Morrison & Phelps, 1999). It does not, however, explicitly capture initiative aimed at influencing the strategy of an organization (e.g., product or service offerings). To broaden the measure and capture innovation efforts beyond process or administrative changes, several additional items were developed which focus on product or business strategies (e.g., changes to a product design, pricing, marketing, or positioning). These additional items, along with *taking charge* items (the five highest-loading items from the original study), were pretested with students in an executive education class. A final set of items was chosen based on this pretest. Specific items are listed in Table 5.

¹¹ These response rates only include those who finished each survey. Those who abandoned mid-way through the survey are not included in these totals. Among complete respondents, however, some items may have missing data, because supervisors were able to skip specific questions at their discretion.

A behavioral scale was utilized to maximize comparability across respondents. Interns were instructed to “Think about your own attempts to initiate change and innovation in the organization during your internship. For each of the following, indicate how often you have demonstrated the behavior described, if at all.” Response categories included “never,” “once,” “two or three times,” and “four or more times.”¹² These response categories were converted to numerical values reflecting an approximate count: 0, 1, 2, or 4 respectively.

To reduce demand effects, the question introduction also indicated that such innovation efforts may or may not be common among interns in a given context (see the Appendix for complete wording). To further increase the reliability of this measure respondents were asked to “identify a specific example of how you demonstrated initiative during your internship in one of the areas listed above.” These open ended responses were not analyzed for the purposes of this dissertation, however a sample of the responses are included in Table 6. The use of a self-report measure is consistent with the arguments of OCB researchers who have found that self-report measures have greater construct validity and provide more reliable measures (Lam, Hui, & Law, 1999; Van Dyne & Ellis, 2004). Furthermore, because the primary independent variables were reported by supervisors, there is not a concern with single-source bias in using the self-report measures for innovation effort.

Exploratory factor analyses of the responses of interns suggest three distinct factors which correspond with distinct areas of innovation effort. These include process innovation effort, core strategy innovation effort, and outward strategy innovation effort. The factor loadings and specific items associated with each component are listed in Table 5. Confirmatory factor analyses also indicated that this three factor model best fits the observed data. Item four was dropped from analyses due to cross-loading. This resulted in three items for each of the

¹² The original items included the word often, as in “I have often tried...” and the response scale was a 5-item strongly agree to strongly disagree scale.

innovation areas, with reasonable loadings for all items other than item seven (a loading of .59). For analyses, however, item seven was included at this stage given its conceptual relevance.

The items in *process innovation effort* suggest efforts focused on more administrative activities or efforts to innovate in how core tasks and processes are accomplished. The *core strategy innovation effort* items capture efforts to influence the central business offering of the firm. This includes attempts to change existing products and services, or introduce new offerings, as well as efforts to improve core technologies and systems. This final item fits the construct, given the essential nature of systems and technology to the production and or delivery of the services or products at the center of a business strategy. The third factor, *outward strategy innovation efforts*, reflects efforts to modify external aspects of an organization's strategy, such as marketing tactics, pricing, the selection of target markets, or partnership activities.

Because the response scale essentially captures a count of behaviors, the numeric count (0, 1, 2, or 4) for all items for a given construct were summed, creating a cumulative count of individual process and strategy innovation efforts. (A separate approach, of simply averaging the response scores, coded ordinally as 0, 1, 2, or 3 sequentially, was also examined, but produced consistent results.)

Unit-Level Independent Variables: Structural & Social Integration

The following independent variables all measure characteristics of organization that affect how the work units are integrated within the organization. Because the supervisors are most likely to have an accurate understanding of the organizational structures, the following measures are based on responses from supervisors.

Centralization. A number of approaches have been used to measure centralization including assessment of whether specific decisions are made at the operating unit level or higher

levels (Inkson et al., 1970; Miller, 1987), as well as more general measures that capture the level of top-management involvement in decisions (Baum & Wally, 2003; Wally & Baum, 1994). For the purposes of this study, unit autonomy best reflects the level of centralization (low autonomy) or decentralization (high autonomy). A measure used by Birkenshaw et al. (2002; $\alpha = .86$) to measure autonomy of R&D groups was adapted to apply to work units more generally regardless of function.¹³ Four items were included with the instruction to “indicate how decisions regarding the following items are typically made in your organization.”:

1. The overall direction of your department/unit’s efforts
2. Which projects your department/unit pursues
3. Your department/work unit’s budget
4. The performance standards for your department/unit

The full measure, including additional introductory wording is included in the Appendix. A five-point response scale was used, as follows: 1=decided independently by the unit, 2=decided by the unit after consultation with higher-level management, 3=decided by unit, subject to approval by higher-level management, 4=decided by higher-level management after consultation with the unit, and 5=decided by higher-level management. Centralization was operationalized as the mean of all items ($\alpha = .85$)

Cross-unit Integration. Measures of cross-unit integration were developed based on measures used by Miller (1987) as well as the general description of interdependence proposed by Lawrence and Lorsch (1967a). Birkenshaw et al. (2002) operationalized interunit integration based on personnel interactions between departments, similar to an approach developed by Miller (1987) that assessed the level of cross-integration mechanisms on similar dimensions. Items used in this study were taken primarily from Miller’s (1987) scales, with the addition of two items

¹³ One item, “Product design,” was dropped because this can not easily be translated to apply to all functional areas.

adapted from Birkenshaw et al. (2002) and one item from Zahra and Nielsen (2002).

Respondents were instructed to “indicate the extent to which you agree or disagree with following items, as they apply to your company or organization” for six items. (Items are listed in the Appendix.) A five-point disagree/agree Likert response scale was used, with anchors of strongly disagree (=1) and strongly agree (=5). (See the Appendix for the actual questions as presented.) Cross-unit integration was operationalized as the average of all items ($\alpha = .71$).

Boundary spanning. The level of boundary spanning was measured using items adapted from Leifer and Huber (1977). This measure captures the level of interaction employees have with others outside the boundaries of the formal organization on several dimensions, including meetings, communications, information use, and other coordination activities. Specific items are included in the Appendix. A five-point disagree/agree Likert response scale was used, with anchors of strongly disagree (=1) and strongly agree (=5). The degree of boundary spanning was operationalized as the mean of all items ($\alpha = .87$).

Blended work arrangements. Drawing on Schilling and Steensma’s (2001) study of alternative work arrangements, measures of both contract workers and temporary workers were included. Both can be employed by a contract company, or hired as subcontractors directly by the firm, and may or may not work at the client site. Contract workers are likely to have professional or technical positions, while temporary workers are more likely to fill clerical, labor, or other low-skill service positions (Schilling and Steensma, 2001). I operationalized the level of blended work arrangements as the count of temporary or contract workers (combined) in the focal workgroup during the past three months. Supervisors provided counts to total employees in the work unit, as well as contract and temporary employees using open-ended questions with language adapted from the National Organizations Survey (Kalleberg et al., 1996). Specific question wording and presentation can be found in the Appendix. Because unit size was

incorporated in the models separately, the sum (rather than a percentage or ratio measure) of these categories was used as the operationalization of the level of blended work arrangements.

Permanent/temporary workgroup status. The temporary versus permanent status of a workgroup was assessed by asking supervisors the following yes/no question: “Is this workgroup a temporary unit within the organization that will be dissolved or reorganized upon completion of a specific project or task (for example, a consulting or audit team)?” This measure was coded as 1 if the supervisor responded “yes” and 0 otherwise.

Geographic dispersion. Geographic dispersion can be conceptualized of as both an actual measure of the distance between employees, or as a simple measure of the degree of collocation without factoring in the actual distance. For this study, a categorical question was used as the primary method to measure geographic dispersion. Supervisors were asked “Which of the following best describes your workgroup in terms of where employees are located?” Categorical responses included: “Everyone works in the same work area,” “Everyone works in the same building, but multiple work areas,” “Employees work in multiple buildings, but in the same area,” “Employees work in multiple cities,” and “Employees work in multiple countries” (see Appendix for actual measure as presented in the instrument). Responses were coded ordinally from 1 to 5 respectively. This approach generally captures the degree of separation among employees in the unit, although it does not capture the number of employees at different locations. The actual locations of all worksites for all members of the unit, and numbers of individuals at each site were collected as well, but this data was not analyzed in this study. An alternative simple measure was collected by asking “What percentage of the workgroup's employees work remotely the majority of the time (i.e., either from home, a satellite office, or in the field)?” The numeric estimate was utilized in supplemental analyses of the effects of geographic dispersion.

Decision process involvement. To measure decision process involvement among employees within the work unit, measures were included that are similar to those used by Barringer and Bluedorn (1999) to determine the level of involvement among the “rank-and-file” employees during various stages of the process. The items were adapted to reflect involvement in the strategic decision-making stages identified by Fredrickson and Mitchell (1984): situation diagnosis, alternative generation, alternative evaluation, and decision integration. Item wording is as follows: “Organizations also differ in the extent to which nonmanagers (e.g., staff or line employees) are involved in making decisions. Indicate the extent to which nonmanagers in your department/workgroup are involved or uninvolved in the following decision-making steps.” For each of the four phases, the supervisor will respond using a five-point scale ranging from no involvement (=1) to substantial involvement (=5). The mean of all four items was used to indicate decision process involvement (alpha = .91). Actual presentation of the measure can be seen in the Appendix.

Ego Network Independent Variables: Social Integration

Two of the key independent variables capturing the nature of social integration of the individual within the work unit are derived from measures captured using an egocentric network instrument. This approach captures a focal individual’s set of workplace ties rather than measuring the complete social network within an organization. Such an approach is appropriate for understanding the influence of social interactions on behaviors of the focal individual (Walker, Wasserman, & Wellman, 1993; Morrison, 2002), such as individual innovation efforts.

A standard network generation instrument, based on prior studies (Burt, 1984; Ibarra, 1995; Podolny & Baron, 1997; Morrison, 2002), was used to collect the ego network data. Informational, reporting, and friendship ties were collected using an open-ended name generator.

(See Appendix for the actual presentation of the instrument.) Individuals were first prompted to enter the names (first name & last initial only) of “people who were valuable sources information for you, including individuals to whom you reported and others you interacted with regularly as a part of your job.” This language corresponds to that used in earlier studies (Ibarra 1992, 1995; Morrison, 2002). Individuals were told to “list as few or as many as necessary, focusing on those with whom you had significant interaction.” In a second text box the individual was asked to list “people whom you considered to be friends (people you might see on breaks or outside of work)” with the instruction to not repeat any names from the first list.

The intern (“ego”) then answered questions about each of the alters he or she listed in the first step. First, for each alter the ego indicated the organizational affiliation (1=same workgroup, 2=same company, different group, 3=different company), geographic proximity (1=same work area, 2=same building or campus, different work area, 3=different city, state, or country), and functional similarity (0=same/similar functional, 1=different function). Next, they indicated their reporting relationship (1=I reported to this person directly, 2=I reported to this person indirectly, 3=no reporting relationship) and the alter’s hierarchical position (1=non-manager/staff, 2=low-level manager, 3=mid-level manager, and 5=exec./senior manager). Communication frequency with each alter was captured using the following scale: 1=more than once a day, 2=once a day, 3=several times a week, 4=once a week, 5=less than once a week. Friendship strength was also captured using the following scale: 1=not friends, 2=weak friends, 3=close friends, 4=very close friends. A number of these are not specifically utilized in this dissertation, however. Construction of network measures actually used is detailed below.

Ego network size. The primary measure of workplace network size is a simple count of total workplace alters listed (Podolny & Baron, 1997), whether or not they are friendship or social ties. A separate measure of only friendship ties was calculated and utilized as a supplemental test

of network size effects, however overall network size measure is reported in the main models. *Tie closeness*, operationalized as the average of tie closeness (friendship strength) scores across all alters (1 to 4), was also calculated and incorporated in supplemental tests as an alternate control for the specific characteristic of each individual's network. *Network diversity* was operationalized as a count of alters outside the ego's functional area. A ratio measure was not used because total network size was included in the models simultaneously.¹⁴

Individual-level independent variables

Proactive personality. Proactive personality was measured using a subset of twelve items from the scale as developed and validated by Bateman and Crant (1993; alpha = .81 to .89). Responses were on a 5-point Likert-scale ranging from 1=strongly disagree to 5=strongly agree. (Specific items are listed in the Appendix.) Interns provided this measure during the first survey, at the beginning of the internship, to capture a measure of personality reflected in their prior life experience. Proactive personality was operationalized as the mean of all items (alpha = .90).

Breadth of experience. While earlier measures of experience breadth simply counted all prior work or significant extracurricular experiences for a given individual (Bateman & Crant, 1993), for the purposes of this study a more direct measure of experience breadth was utilized. On the initial survey, each intern was asked to "Indicate the amount of experience you have, if any, in each of the following functional areas" including eight primary functions such as accounting, finance, marketing/sales, and R&D/engineering. (See Appendix for a full list of items). A four-point scale was used with categories including "no experience," "limited experience," "moderate experience," and "extensive experience." These were coded as 0, 1, 2, and 3 respectively. All were summed to create an overall measure of experience breadth. An

¹⁴ Supplemental operationalization approaches could include an entropy measure (Blau, 1977; Teachman, 1980) of hierarchical level (Allison, 1978) of alters, to capture diversity in terms level within the organization.

entropy measure was also utilized in supplemental analyses. The experience count measure (Bateman & Crant, 1993) was also captured for supplemental analyses.

Organizational & Work Unit Control Variables

The variables described in this and the following sections are included to control for possible factors that may influence both predictor variables, and the likelihood of individual innovation efforts. Many of these have been demonstrated to influence behavioral measures likely correlated with innovation efforts. Although some may be unrelated to the key independent variables, because of their frequent mention in the literature they are included to proactively address any issues that may be raised. In final models only a subset of these controls have been included.

Organizational age (in years) and *size* (in employees) may influence the supportiveness of the organizational culture for change activities, as well as organization complexity or flexibility, which are likely to influence the likelihood of individual innovation effort. They are also potentially related to other independent variables, and are therefore important to include in the models as controls. These measures were obtained from the supervisor. A log transformation of organizational size was utilized in the final models. Because *industry* characteristics may influence the structural characteristics of organizations, as well as the nature of products, services, and operations (which in turn may influence the ability of individuals to engage in innovation efforts), dummy variable controls for industries were created and included in the analyses. Industry assignments were based on archival records of the industry of the firm where each individual worked. Industries included consulting, investment banking, other professional services, technical services, technology manufacturing, other manufacturing, consumer products, and other services (including non-profit, education, and government).

Work unit factors. *Unit size* was operationalized as the number of full-time employees dedicated to working for the unit, regardless of the physical location of the individuals. This information was obtained from supervisors using an open-ended question: “How many full-time employees are in your workgroup (including contract and temporary employees)?”

Workgroup heterogeneity in terms of functional representation and tenure heterogeneity may be related to both certain structural factors, as well as the likelihood of individual innovation efforts. For example, a more heterogeneous environment may facilitate the flow of information enabling innovation efforts, while a very homogenous group is likely to reinforce views and demonstrate greater inertial tendencies. Two critical dimensions are *functional heterogeneity*, indicating the diversity of core business functions represented, as well as *tenure heterogeneity*. An entropy-based measure (Teachman, 1980; Ancona & Caldwell, 1992) was constructed to operationalized functional heterogeneity. Supervisors were asked to indicate the number of members of the work unit in each of the following functional areas: Accounting/Finance, Marketing/Sales, R&D/Engineering, Operations/Production, HR, General Management, and other. The following formula will be used to obtain a functional heterogeneity index (H):

$$H = - \sum_{i=1}^j P_i (\ln P_i)$$

P_i reflects the fractional share of members associated with each of j functional areas, excluding areas with no individuals. Thus, the more areas represented and the greater the distribution across functional areas, the higher the functional heterogeneity.

Tenure heterogeneity was measured by asking the supervisor to indicate how many employees in the work unit fall into each of the following categories based on how long they have worked in the unit: less than 6 months, 6 months to 1 year, 1 to 2 years, 2 to 5 years, and more than 5 years. An entropy measure, similar to the one above for functional heterogeneity will be

used to obtain an index of heterogeneity. *Tenure average* was also incorporated as a control variable in the testing of models.

Support for innovation. As discussed in the literature review, organizational culture is consistently a strong predictor of the behavior of individual employees. *Support for innovation* (Scott & Bruce, 1994; Morrison & Phelps, 1999) has been measured in previous studies and been found to predict levels of individual initiative. An abbreviated measure was included in the supervisor survey, consistent with the adaptation used by Morrison and Phelps (1999; alpha = .92). The mean of responses to the items listed below (answered using a five-point Likert scale ranging from 1=strongly disagree to 5=strongly agree), was used for this measure.

1. Creativity is encouraged here.
2. Our ability to function creatively is respected by the leadership.
3. This organization can be described as flexible and continually adapting to change.
4. This organization is open and responsive to change.
5. This organization publicly recognizes those who are innovative.

Internship & Job Characteristic Control Variables

Internship functional area. Because the functional area of an internship could be directly related to individual innovation efforts, each internship was classified based on the self-reported functional area provide by each intern. For example, a marketing intern may be expected to attempt to develop new marketing strategies or ideas, therefore enhancing the likelihood of reported individual innovation efforts. Because functional assignments may also be related to other work unit characteristics, dummy-variable controls for the various categories were created. Categories include general management, sales/marketing, accounting, consulting, finance/banking, general management, operations/IT, and other.

Internship hierarchical level was also measured and incorporated to control for the possibility that interns working in roles involving greater responsibility and oversight may be more likely to engage in innovation efforts. This was measured by asking each intern “How would you characterize the level of your intern position within the organization?” Responses categories were Entry-level staff (=1), Experience/senior staff (=2), Low-level supervisor/manager (=3), and Mid-level manager or above (=4).

Internship duration was calculated in weeks based on the start and end dates reported by the intern. Because compensation may also influence motivation to engage in efforts such as individual innovation, and may be correlated with other independent variables, a control for *weekly salary* was included. This was obtained from archival internship data. A more simple binary *paid/unpaid internship* measure was also constructed. The *average hours worked per week* was provided by interns in their final survey.

Because autonomy may influence the ability of individuals to engage in individual innovation efforts, and also be related to other structural characteristics, a measure of *job autonomy* will be included as a control ($\alpha = .73$). Job autonomy was measured using three items adapted from Hackman and Oldham (1980; cf. Morgeson, Delaney-Klinger, & Hemingway, 2005), including “I have significant autonomy in determining how I do my job,” “I can decide on my own how to go about doing my work,” and “I have considerable opportunity for independence and freedom in how I do my job.” Two other items to capture the level of *supervisor feedback* (Hackman & Oldham, 1980) were also included to control for the potential motivating or enabling effect of such supervisory behaviors, independent of other independent variables: “Supervisors and coworkers almost never gave me any feedback about how well I was doing in my work (reverse coded)” and “Supervisors often let me know how well they thought I was performing” ($\alpha = .78$). The autonomy and feedback items were evaluated by interns

using a five-point scale ranging from 1=strongly agree to 5=strongly disagree. *Task interdependence* may influence both social integration and innovation efforts, so a single-item measure, adopted from Hackman and Oldham (1980) was included: “To what extent did your internship require that you work closely with other people?” The seven-point response scale ranged from very little (=1) to very much (=7).

Employee perceptions of the culture are also potentially important determinants. *Psychological safety* reflects this appraisal by individuals regarding the personal risks they might face through demonstration of initiative (Ashford et al., 1998). The following three items (adapted from Ashford et al., 1998) were assessed by the intern using the same five-point agree/disagree scale: “It is safe for me to make suggestions,” “It is safe to give my opinions,” and “It is safe for me to speak up around here” (alpha = .88). Finally, to control for the motivational effects of *job satisfaction*, a seven-item measure of satisfaction with various aspects of the internship was included (adapted from Brayfield & Roth, 1951; alpha = .85). Interns evaluated aspects such as “the nature of the work,” “the level of formal training,” and the “internship overall” using a five-point scale ranging from very dissatisfied (=1) to very satisfied (=5).

In a limited number of cases some interns may have had previous experience in the organization, or may have had personal ties to individuals within the organization prior to internship specific contacts (i.e., recruiting interviews). To measure this, individuals will be asked to indicate their level of prior ties to and experience with the organizations using the following scale: no prior contact (=1), knew individuals who work at the organization (=2), and had previously worked in the organization (=3).

Other individual characteristics

Basic individual characteristics were also included as controls, including *age* (open-ended report of age in years) and *gender* (from archival records). Intern *ethnicity* (self-report) was also captured, as well as nationality, recorded using an open-ended, and dummy coded to indicate *non-U.S.* nationality. Full-time work experience was measured both in terms of *years of work experience* (self-report) and a count of organizations worked for (*organization experience*), captured as an alternative measure of experience (and ability). Interns were also coded as either undergrad (0) or *MBA* (1). Additionally, each intern's major area of study was also collected from university records and coded as a categorical variable. Two components of the Big-Five personality indicators, *conscientiousness* and *openness*—both of which may predict behaviors related to individual initiative—were measured using brief eight-item instruments validated by Saucier (1994). Because willingness to take risks in the workplace may influence the likelihood that an individual will take actions that may be perceived as unsupportive of the status quo or risky, a measure of *job risk preference* developed by Cable and Judge (1994) as used to capture risk aversion tendencies in the workplace.

ANALYSIS

Measurement reliabilities (Cronbach's alpha) of variables (where applicable) were assessed and reported above. Given the underlying nature of the dependent variable as a count of individual innovation efforts, Poisson or negative binomial models are most appropriate. Examination of the means and variance of the dependent variables indicated overdispersion. Therefore, negative binomial models were utilized to test the hypotheses. To correct for sample selection bias, a two stage Heckman procedure (Heckman, 1979) was used. The sample selection instrument (probability of response) was then included in a series of second-stage nested models.

A base model with controls only was constructed, followed by main effect models, and finally a sequential test of squared term effects and interaction effects. A final, omnibus model including all significant quadratic terms and interactions was then evaluated, and provided the basis for hypothesis tests. Missing variables were treated with listwise deletion. Because the number of observations was not sufficient to allow for simultaneous testing of all control variables and independent variables, control variables that were consistently non-significant were dropped from the final reported models. In addition to testing for the significance of individual coefficients, the significance of the model fit was evaluated by assessing the change in -2 Log Likelihood scores.

CHAPTER 5: RESULTS & DISCUSSION

This chapter presents general descriptive statistics as well as detailed results from statistical analyses. Discussion addresses results for both control and independent variables, with results for each hypothesis reviewed in detail. Because of the number of hypotheses, a discussion of the results, including possible interpretation and implications of findings, are presented along with the results. Overall patterns of findings are then considered generally, with additional discussion of conclusions in Chapter 6.

DESCRIPTIVE STATISTICS

Descriptive statistics (mean and standard deviation) and correlations among all variables are provided in Table 7. Reliabilities for all multi-item measures (reported above in methods section) are all acceptable at levels above .70. Statistics reported in Table 7 are based on only the final observations in the full models reported below. Correlations among the key independent variables are generally low. The strongest correlations are between decision process involvement and two other structural variables. Decision process involvement is modestly correlated with cross-unit integration (.26) and boundary spanning (.24). Although these are not high enough to warrant significant concern, additional tests for multicollinearity were conducted. Examination of Variance Inflation Factor (VIF) values in OLS models did not indicate problems with multicollinearity in main effect models (all VIF values < 10). Collinearity is present with interaction terms and quadratic terms included in the model. However, mean centering these variables reduces collinearity but does not substantially alter model results.

It is worth observing that process innovation efforts are most common among the three types of individual innovation effort, with a mean of 4.49. This is consistent with the idea that

opportunities to implementing changes to routine tasks are likely to be more common, and perhaps require less effort. Outward strategy innovation efforts were less than half as frequent (a mean of 2.13), and core strategy innovation efforts were only slightly more frequent. Although the magnitude of this difference between process innovations and strategy innovations may be magnified in internship contexts, such a pattern is consistent with the nature and anticipated complexity of each of the separate types of efforts.

SELECTION MODEL

A first-stage Heckman selection model predicted likelihood of inclusion in the final sample (response by both the intern and supervisor). The first-stage probit model is not presented in tables, however results are available upon request. Predictors included in this stage included those available from archival sources for all interns, including gender, MBA/undergraduate, semester of internship, internship industry, internship function, and salary. Women were more likely to be in the final sample, where as spring semester interns and investment banking interns were less likely to be in the final sample. This final difference may be in part due to a reluctance or formal policy of not responding to surveys among investment banking firms. Those in general management functions were also more likely to be included in the final sample. All models presented include the Heckman instrument. The sample selection instrument does have a significant relationship ($p < .05$) with the outcomes of process innovation effort and outward strategy innovation effort in some preliminary models, although not in the final full model (see Tables 8 and 10). These findings suggest that there might be a weak positive relationship between the likelihood of response, and the likelihood of individual engagement in innovation efforts of some types. Thus, the inclusion of a sample selection instrument provides an important mechanism to control for potential response biases in the models.

MODEL OVERVIEW & ROBUSTNESS CHECKS

The results of negative binomial regression models are reported in Tables 8, 9, and 10, for each of the three dependent variables respectively: process innovation efforts, core strategy innovation efforts, and outward strategy innovation efforts. As described in the preceding chapter, the first model (Model 1) in each table presents the base model with control variables only. Model 2 adds all main effect independent variables, and Models 3 through 12 sequentially add a single quadratic or interaction term as a first step to testing for curvilinear relationships or interactions. The hypothesis associated with each independent variable is listed as well. The number of observations is consistent across all models ($n = 355$, reduced due to missing data) for comparability. Model 13 in each table reflects the full model, with all quadratic terms and interactions significant in earlier models included. Results of hypothesis tests are assessed based on these final, full models. Given thirteen hypotheses, tested across three separate dependent variables, only results significant at the $p < .05$ level (two-tailed tests) are discussed. Although there are a number of relationships significant at the $p < .10$ level, these are not considered due to the potential for inflated Type-I error rates. The results of hypothesis tests are discussed sequentially below, with consideration of each prediction vis-à-vis the three distinct dependent variables. Table 11 provides a summary of the findings for all hypotheses across all dependent variables.

Because some interns worked in the same unit, there is a possibility of non-independence among the observations. There were not sufficient clustered observations (by unit/supervisor) to conduct HLM analyses, however. In the final dataset, thirteen supervisors were matched with two interns, two were matched with three interns, and one supervisor response was matched with four interns. As a robustness check, multiple observations per supervisor were dropped (so each supervisor response had only one intern response) and the models were reanalyzed. Results were

consistent across all dependent variables, so models utilizing the small number of non-independent observations are presented.

CONTROL EFFECTS

Before considering the hypothesized relationships in detail, I will first highlight and briefly discuss the significant control variables and their association with low-level individual innovation efforts. Organizational size (in terms of employees) appears to inhibit innovation even at the lowest levels, consistent with earlier research examining entrepreneurial behaviors in firms (Barringer & Bluedorn, 1999). The final model in Tables 8 demonstrates that process innovation efforts are negatively associated with the size of an organization ($p < .01$). The necessity of coping with a much larger organization may result rigid internal processes, at least as perceived by lower-level staff. These constraints are apparently in force even at the workgroup or department-level in organizations. To the extent that organizational size is associated with higher levels of bureaucracy, such findings are consistent with earlier research showing decreased organizational innovation in the presence of greater bureaucracy (Damanpour, 1996a, 1996b).

The only other organizational control demonstrating a significant relationship with individual innovation effort is functional diversity present at the unit level ($p < .01$). In this case, it is positively associated with outward strategy innovation (Table 10), suggesting that the heterogeneity found in multifunction units is associated with greater opportunity or motivation to engage in exploration of novel aspects of outward strategy (whether new partnerships or markets). This may also be a result of greater breadth of communication common in functionally diverse units (Ancona & Caldwell, 1992), which could contribute to the identification of opportunities to engage in innovations in outward strategy. Functional diversity may also indicate greater general flexibility in such units, which could foster innovation efforts.

A number of job characteristics included as controls are also related to individual innovation efforts. For example, the hierarchical level of the intern's position is positively related to all three types of innovation ($p < .05$). As expected, involvement in innovation increases as individual take on greater responsibility. This is perhaps due to role expectations that are more likely to include process or strategy improvement efforts, or greater access to information, ideas, or additional resources associated with greater oversight and authority. Interns who worked in supervisory roles or low-level management positions were more likely to attempt such innovations. As such, intern hierarchical levels is an important control and provides additional confidence that other effects of structural and social integration are independent of the hierarchical level of individuals. Supplemental analyses which removed all observations where the intern worked in a supervisory or managerial position produced results consistent with the models presented

Interns working in general management roles were more likely to engage in core strategy innovation efforts. General management functions are characterized by responsibilities across functional areas, and concern for the achievement of some central business objective. As such, the positive relationship with core strategy innovation efforts such as refinements to products or services would be expected. It is possible that process innovation and outward strategy innovation efforts, because they may tend to be more focused, are not enhanced by broad functional duties. Working in a marketing related function also has a statistically significant positive relationship with outward strategy innovation efforts ($p < .001$). This is likely to be a result of in-role expectations that marketing interns would pursue initiatives that include marketing changes (e.g., pricing, promotion, or target customers) as well as development of relationships with external partners that are related to marketing or sales efforts. These significant findings suggest that it is important to consider the in-role expectations as motivators

of innovation efforts, and also provide greater confidence that other results are not the result of unobserved functional demands that may somehow be correlated with other independent variables (e.g. cross-unit integration or boundary spanning).

For process and outward strategy innovation efforts, task interdependence does demonstrate a positive relationship ($p < .05$). This could be considered as an alternative source of social integration at the individual employee level, and supports arguments that greater integration is beneficial to innovation efforts. Process innovation and core strategy innovation are also associated with higher degrees of autonomy ($p < .05$ & $p < .01$). Given the emphasis of autonomy on flexibility in how employees execute their tasks, this is both an understandable finding, and evidence for the negative effect of organizational constraints (in the case of low autonomy) on innovation efforts. This is also consistent with prior research that has identified a positive relationship between autonomy and levels of personal initiative (Speier & Frese, 1997). Apparently the facilitation of individual innovation efforts extends beyond processes to core strategy innovation as well. These results do conflict with research suggesting no link between autonomy and innovation at an organizational level (Abbey & Dickson, 1983), although many intermediate steps separate individual innovation efforts and macro organizational innovation. This may mask the effect of individual autonomy on organizational innovation.

Core strategy innovation efforts are associated with lower levels of job satisfaction ($p < .05$). This could be explained either as a motivational effect (i.e., individuals unhappy with the situation were motivated to try to change things) or as an outcome of frustrations with unsuccessful efforts to initiative innovations. The latter outcome is consistent with prior research showing that dissatisfaction can motivate individual efforts to effect change (Zhou & George, 2001). To the extent that process innovation efforts are more easily pursued, individuals engaging in such efforts may experience greater satisfaction because they are better able to see

results from their efforts. The lack of a significant relationship between satisfaction and process innovation efforts suggests that dissatisfaction is not a motivating force. If it were, one would expect job satisfaction to also be negatively associated with process innovation efforts. Rather, the dissatisfaction is likely a result of frustration with difficulty encountered during efforts to introduce change. Given the cross-sectional measure of satisfaction simultaneous with the measure of innovation efforts, the data in this study are insufficient to make a clear distinction on this point, however.

Finally, internship length is associated with process innovation efforts ($p < .05$). Such efforts are the most common type of efforts among individuals in this sample, and therefore are more likely to be repeatable. Thus, more time in an organization is likely to create a meaningful opportunity for greater process innovation. Additional control variables described in Chapter 4 and included in the descriptive statistics (Table 7) were not statistically significant predictors of any of the types of individual innovation effort, and were thus dropped from the final model sequences.

RESULTS & DISCUSSION

Structural Integration Predictions

H1 – Centralization. Results from the main effect models (Model 2) in Tables 8, 9, and 10 show no negative main effect for centralization on any measure of individual innovation effort, contrary to the prediction in Hypothesis 1. However, because a curvilinear relationship was predicted for other forms of structural integration, the quadratic term was also tested. The final model in Table 8 shows a significant inverted U-shaped curvilinear relationship between centralization and process innovation efforts ($p < .01$). This relationship is plotted in Figure 6. As

seen here, the inflection point is very near the mean level of centralization, with decreasing levels of process innovation efforts both above and below the mean.

The negative effect of centralization at higher levels is consistent with theoretical arguments suggesting that integration of this type will limit motivation (Damanpour, 1996a) and decrease a sense of felt responsibility as individuals come to rely on top down direction in the firm (Bartlett & Ghoshal, 1996). It is possible that in highly centralized organizations, perceived rigidity of systems and process inhibited individual innovation efforts. However, the negative effect at the other end of the scale, in more decentralized firms, is somewhat surprising. The dispersion of power to units at lower levels of the organization that accompanied decentralization (Damanpour, 1996a) does not apparently translate into opportunities or motivation for individual process innovations. On the contrary, individuals are apparently constrained in this condition as well.

One possible explanation is that some level of involvement and oversight from higher organizational levels creates a unit-level culture that is more performance oriented. This could result from the need to routinely report performance and seek guidance from higher level management. These pressures, up to a modest level, may motivate process innovation behaviors. It may also be that decentralization is associated with fewer opportunities to change processes within a unit if the local managerial discretion fosters more rigid managerial styles. These findings do support the reconciled view that modest levels of integration are optimal for innovation efforts in the process domain. The lack of relationship with either type of strategy innovation efforts suggests that the influence of centralization is more procedural than strategic.

H2 – Cross-unit Integration. Cross-unit interaction, on the other hand, does not demonstrate an inverted U-shaped curvilinear relationship with any of the types of individual innovation efforts, contrary to Hypothesis 2. No statistically significant relationships are found in

the models presented. These findings suggest that the predicted benefits of information flow through cross-unit coordination mechanisms (Ancona & Caldwell, 1992; Koberg et al., 2003; Zahra & Nielsen, 2002) are not contributing to the ability of individuals to innovate in this context. Arguments that integration increases implementation complexity (Dougherty, 2001; Joyce et al., 1997; Soreson, 2003) and creates inefficiencies (in part due to politicization) that impede coordination and change (Kouvelis & Lariviere, 2000) are also not supported. In the case of process innovation, the effect is moderated by the experience breadth of individuals (discussed in greater detail with Hypothesis 13 below). In this context, however, there is no evidence of a generally beneficial or constraining effect of cross-unit integration. It is possible that interns do not have sufficient time in the organization to be significantly influenced by cross-unit connections. It is also possible that the positive and negative effects of cross-unit integration may cancel each other out, rather than producing a curvilinear relationship.

H3 – Boundary Spanning. Although the positive linear relationship between boundary spanning and innovation effort (Hypothesis 3) is not supported, an inverted U-shaped relationship between boundary spanning and outward strategy innovation is observed ($p < .05$) in the final model in Table 10 (outward strategy innovation efforts). There is no support for any form of association between boundary spanning and other types of innovation, however. Figure 7 depicts the curvilinear effect of boundary spanning on outward strategy innovation, showing that the inflection point is near the mean, and the level of outward innovation effort drops off above and below the mean.

As with centralization, although the curvilinear effect was not predicted a priori, the findings are consistent with the general theory suggesting that too much or too little integration can be detrimental. It also reinforces a pattern of overlap whereby the type of integration most relevant for a given type of innovation effort is the type most similar conceptually. For example,

boundary spanning affects outward strategy innovations (marketing, target segments, and partnering), but shows no significant relationship with other types of innovation. This suggests that integration levels most related to the innovation of interest are critical. These findings do not necessarily broadly support the transfer of novel information arguments (Coopey, Keegan, & Emler, 1998; Yli-Renko, Autio, & Sapienza, 2001; Inkpen & Tsang, 2005), since it is not fostering process innovations in this context for example. But it is possible that the boundary spanning ties, as they increase to a modest level, will increase the flow of ideas related to outward marketing activities.

Within the sample, the mean level of boundary spanning is quite high, but beyond the mean, the level of outward strategy innovation drops off. This might be explained by the constraint or complexity arguments used elsewhere (cf. Sorenson, 2003). If work units are already engaged in very high levels of boundary spanning activities, the need for or opportunity for changes to alliances or partnerships is likely to be lower. There may also be a saturation effect, whereby at some point the flow of ideas that may trigger innovation is no longer enhanced by additional ties. Thus, the additional connectedness at high levels of boundary spanning no longer provides any positive effect, and the constraints created by many or very strong outward ties may limit the opportunity for additional innovation in outward strategies. It is also possible that boundary spanning activities take so much time and energy that individuals are less motivated or able to spend time engaging in innovation efforts. Nevertheless, because the distribution of boundary spanning levels is left skewed, with a relatively high mean and bounded levels of boundary spanning to the right, for much of the observed data distribution the boundary spanning effect is positive as predicted.

H4 – Nonstandard Employees. Although the predicted curvilinear relationship (Hypothesis 4) is not supported, evidence of a negative relationship between higher levels of

nonstandard employees (temporary and contract workers) and core strategy innovation efforts is supported in the final model in Table 9 ($p < .01$). Thus, theories that nonstandard workers will infuse organizations with novel information and ideas (Matusik & Hill, 1998) or create greater organizational flexibility by reducing in-group biases (Hogg & Terry, 2000) do not hold when considering the manifestation of such ideas in innovation efforts. In both process innovation and outward strategy innovation, nonstandard employees are apparently a nonfactor. But the demotivating effects of the presence of contract or temporary workers (Davis-Blake, Broschak, & George, 2003) does appear to come into play when considering innovation effort in the area of core strategies. This may be a structural effect, however, whereby units with high degrees of nonstandard employees are also less likely to be involved in the core products and services of a company.

More extensive use of nonstandard employees may also indicate an organization that has reached a state where processes and routines are well established, and the focus is on executing a essentially set strategy as efficiently as possible. Thus, the causal relationship may be somewhat ambiguous, although these effects are net of controls for organizational age, size, and function, so we can be somewhat confident that the effect is associated with the integration of nonstandard employees into organizational units. The presence of this relationship with only this type of innovation, and not with process or outward strategy innovation is also informative, and further suggests that this is not a critical determinant of innovation efforts broadly. It may also be possible, however, that the duration and nature of internships may mask effects of employee arrangements on innovation efforts. Interns are less likely to be sensitive to, and perhaps even aware of the patterns of employment arrangement in organizations.

H5 – Temporary Work Unit. Competing hypotheses predicted both positive and negative relationships between temporary work units and levels of individual innovation efforts.

A significant negative relationship ($p < .05$) between temporary units and process innovation efforts (Table 8, Model 13) provides support for Hypothesis 5b. Thus, in this context the argument that temporary units create opportunities for adaptation without disruption to the larger organization (Grabowski, & Roberts, 1999; MacKenzie, 1986) does not hold. The alternative logic that the temporary nature of units would decrease motivation to engage in innovation efforts, because such efforts are less likely to be retained or utilized, is supported by this finding in the case of process innovation efforts. This makes sense, considering the fact that changes to processes in temporary units, where time pressures may be high due to deadlines, are less likely to produce a long-term benefit. The lack of effect for core or outward strategy innovation efforts suggests that these are less likely to be impacted by the temporal characteristics of a unit, perhaps because such strategies could be expected to outlast a temporary group's lifespan, as in the case of modifications to improve a product or the development of a relationship with a new marketing partner.

Social Integration Predictions

H6 – Geographic Dispersion. No evidence of a relationship between geographic dispersion and individual innovation efforts of any type is found in the models. To test for the possibility that alternative operationalizations of geographic dispersion might reveal a relationship, supplemental models were tested including the percentage of employees who work at remote locations (both linear and squared terms). Results were consistent, and no significant relationship was present, failing to provide support for Hypothesis 6. That geographic dispersion is unrelated to individual innovation efforts further undermines the information flow theories (Burt, 2004; Reagans & McEvily, 2003; Ruef, 2002) regarding individual innovation efforts, to the extent that greater proximity should be associated with richer and more frequent information

exchanges. However, the proposed flexibility and independence associated with greater geographic dispersion due to lower levels of direct supervisor and peer interaction (Callahan, Kirker, & Cross, 2003; Sewell, 1998) are also not evidently enhancing innovation efforts. It is possible that with modern reliance upon e-mail communication, even among coworkers in a common location, geographic dispersion of employees has less of an impact on individual innovation behaviors. It is also possible that the limited duration of an intern's exposure to the work environment limits the effect of geographic dispersion on their ability or motivation to engage in innovation efforts.

H7 – Decision Process Involvement. Main effect models for all dependent measures of innovation effort (Model 2 in Tables 8-10) do not offer any support for a positive effect of decision process involvement, as predicted in Hypothesis 7. Additional tests reveal only an interactive effect between decision process involvement and proactive personality, as seen is Model 13 in Table 9. Because the only evidence of an effect is in the presence of an interaction, these relationships are discussed in greater detail below (Hypotheses 10). The non-significant direct effects of decision process results suggest that the logic linking greater involvement with higher levels of motivation and access to information that will uniformly enable innovation efforts may not apply, at least in the context of internships. However the interaction effects (discussed below) suggest that it does play a role. The nuanced effect of decision process effects are discussed below.

H8 – Network Size. The inverse-U shaped prediction for ego network size (Hypothesis 8) is not supported in the models; however, evidence of a statistically significant positive relationship ($p < .01$) between network size and outward strategy innovation is seen in Table 9 (Model 13). This finding suggests that the size of an individual's workplace network is not an essential determinant across all types of innovation. This is a relatively gross measure of

integration, but one which does address the level of connectedness an individual has with others in an organization. The positive relationship with outward innovation efforts supports the view that larger networks are able to provide valuable information (Granovetter, 1973; Reagans & McEvily, 2003) which may in turn be facilitating efforts to introduce changes in the positioning and marketing of products, or in the development of partnerships. However, this effect is not undermined by the potential constraint of a larger network (Mizruchi & Stearns, 2001; Smith & Shalley, 2003). One possible argument is that individuals likely to engage in outward innovation efforts either are naturally disposed to develop many ties, or that the pursuit of such innovations naturally requires development of a larger number of ties. Recent research (Thompson, 2005) does suggest that network building is a mechanism that precedes innovation efforts and initiative. However, in a cross-sectional study such as this, it is impossible to entirely rule out the possibility.

It is also possible that general workplace ties alone are not able to induce strong normative pressures to support the status quo. It may be that only large numbers of strong ties or ties to close friends create constraints. Supplemental analyses of subsets of friendship ties do support this perspective. In the case of process innovation, network counts of only those considered to be close friends or very close friends demonstrates a negative effect on innovation efforts. Thus, in the case of process or administrative activities, there do appear to be some normative constraints that inhibit innovation, consistent with theories predicting such (March, 1991; Salancik & Pfeffer, 1978; Weick, 1995). Nevertheless, these findings suggest the need for additional exploration of more refined measures of network characteristics. It is also possible that individual characteristics may moderate the relationships between ego network characteristics and innovation efforts.

H9 – Network Functional Diversity. Results do not support the predicted inverted U-shaped relationship between functional diversity in an individual’s workplace network, and levels of innovation effort. Differing linear effects are demonstrated in the final models of Tables 9 and 10, with a statistically significant positive relationship between core strategy innovation efforts and diversity ($p < .01$), and a statistically significant negative relationship between outward strategy innovation efforts and diversity ($p < .05$). The difference in the direction of the relationship across types of innovation is intriguing. That functional diversity benefits innovations efforts in the area of core strategy components (products & services) may reflect the necessary involvement of many functional areas in such decisions and development of core strategy ideas. Perhaps outward strategy innovation efforts require less cross-functional awareness, but instead are hindered by the complexities involved in bringing together diverse functional perspectives. Ironically, as discussed above, functional diversity at the unit level, has the opposite effect on outward strategy innovation efforts. Thus individuals who tend to work in one functional area of a larger unit that includes many functional areas are most likely to pursue outward innovations. Such a scenario might be explained by the greater flexibility inherent in a functionally diverse unit overall, while at the individual level, people who are required to work with other functional areas are either less motivated or less able to engage in innovation due to the added effort of individually managing differing perspectives across functions. This complexity might be most disruptive when considering focused strategy innovations such as changes in promotion or pricing, which may be less complex than core innovation efforts.

Interaction Predictions

H10 – Proactive Personality and Decision Process Involvement Interaction. Evidence of a moderating effect of proactive personality on the relationship between decision process

involvement and innovation efforts (Hypothesis 10) is supported, but the form of the interaction does not perfectly correspond with the predictions in Hypothesis 10. The final model in Table 8, predicting core strategy innovation efforts, reveals a statistically significant interaction ($p < .01$), as depicted in Figure 10. As evidenced in the diagram, the interaction is nonmonotonic, with opposite effects for decision process involvement depending on whether an individual scores high or low on the proactive personality scale.

The interaction in Figure 10 suggests that greater decision process involvement increases the likelihood of core strategy innovation efforts among those with more proactive personalities. Conversely, it decreases the likelihood for low proactive personality individuals. That it increases efforts among proactive individuals suggests that process involvement may create greater opportunities for contribution, yet may also increase the demands for individual initiative, perhaps to overcome the greater social normative pressures associated higher degrees of integration among lower-level and higher level employees. These pressures might explain the decrease in innovation effort among less proactive individuals as process involvement increases. The less proactive individuals may merely go along with decisions others are making, rather than speaking up with innovative ideas. As a final note, a positive main effect of proactive personality is observed in the case of process innovation efforts ($p < .01$), as well as outward strategy innovation efforts ($p < .05$). These findings confirm the general theoretical linkage between individual proactive propensity, and individually-led initiative such as change or innovation efforts in organizational contexts.

H11 – Proactive Personality and Cross-unit Integration Interaction. No evidence of an interaction between proactive personality and cross-unit integration is provided in any of the models. Thus, in the context of this study, the general tendency to be proactive and engage in

efforts to influence one's surroundings neither helps nor hinders individuals in their ability to take advantage of integration across units.

H12 – Experience Breadth and Decision Process Involvement Interaction. The interaction between experience breadth and decision process is significant in the preliminary model for process innovation efforts (Model 11, Table 8), but not in the final model (13). This result, plus the null results for the other types of innovation, provide no support for Hypothesis 12. Thus, in the context of this study, merely having greater breadth of experience does not allow individuals to take advantage of greater involvement in decision process by individually driving innovations.

H13 – Experience Breadth and Cross-unit Integration Interaction. Experience breadth does interact with cross-unit integration to influence the level of process innovation efforts (Table 8), although once again the form does not precisely match the predicted relationship in Hypothesis 13. The interaction plotted in Figure 13 differs from the predicted relationship in Hypothesis 13, such that individuals with greater experience demonstrate lower levels of process innovation as cross-unit integration increases. The nonmonotonic relationship observed here suggests that cross-unit integration may offer a more novel environment for individuals who have more focused experience, and perhaps trigger ideas to introduce process innovation efforts. In the case of individuals with already broad functional experience, such cross-unit integration may be less likely to offer novel ideas or information, and therefore provided no benefit to their ability to introduce new process innovations. Perhaps they are also more likely to utilize their broad experience to focus on executing their in-role tasks that may require working across functional areas, rather than expend efforts to try to introduce changes. Once again, these findings are intriguing and worthy of future exploration to fully understand these counterintuitive effects. It is also worth noting that experience breadth has a significant positive main-effect relationship

($p < .01$) with outward strategy innovation effort, suggesting that broader prior experience does contribute to individual abilities to conceive of and pursue changes in the domain of marketing or partnerships.

SUMMARY

The findings outlined above demonstrate both positive and negative effects of structural and social integration on individual innovation efforts, as well as several surprising interaction findings. The results were discussed above in relation to the specific predictions for each type of integration. In the following section the results are summarized and implications for theory and practice are discussed.

CHAPTER 6: CONCLUSION & FUTURE RESEARCH DIRECTIONS

In this final chapter I summarize the findings and address the implications of the study results for both theory and practice. I also address the limitations of the study, and highlight a number of possible future research opportunities to build on the work presented here.

SUMMARY OF FINDINGS

A limited number of significant relationships between structural integration as well as social integration are identified; however in many cases the results do not fully support the hypothesized relationships. For the structural integration variables, centralization (H1) and boundary spanning (H3) both demonstrate inverted U-shaped curvilinear relationships with innovation efforts. However centralization is only associated with process innovation efforts and boundary spanning is only associated with outward strategy innovation efforts. Although these contradict the linear predictions made initially, they do offer support for the general prediction that modest levels of structural integration are most conducive to individual innovation efforts. No significant direct effect of cross-unit integration (H2) is present, although there is evidence that the effect is moderated by individual experience breadth (H13). No evidence of an interaction between cross-unit integration and proactive personality (H11) is found. Non-standard employment relationships demonstrate a negative effect on core strategy innovation efforts, rather than the inverse U-shaped curvilinear relationship predicted (H4). Again, this provides support for the theoretical arguments predicting a negative relationship, while offering no support for the positive effects suggested in theory. Temporary work units are negatively associated with process innovation efforts, as predicted in Hypothesis 5b, and contradicting Hypothesis 5a. Despite the somewhat sparse nature of these findings, they do offer a number of

useful insights to theories linking structural integration to innovation efforts. These are discussed in greater detail below.

Social integration effects on individual innovation efforts are very sparse, and in many cases contradict theory or are inconsistent across the types of innovation. No significant results are found linking geographic dispersion to innovation efforts of any type (H6). Decision process involvement is only associated with core strategy involvement, and in this case only in interaction with individual proactive personality (H10). However, the nature of this interaction contradicts the predicted relationship, as discussed in the review of results in Chapter 5. No support is found for direct main-effects of decision processes involvement (H7), and no interaction effect with experience breadth is observed (H12). Network size does have a positive relationship with outward strategy innovation, rather than the inverse U-shaped relationship predicted (H8). Supplemental analyses indicate a negative relationship when considering friendship ties, but overall these results are not conclusive in their support for theoretical views regarding the effects of social integration. Conflicting findings for the results of functional diversity in workplace networks suggest a positive effect on core strategy innovation efforts, but a negative effect on outward strategy innovation efforts. This provides partial support for the positive effect predicted (H9), but the conflicting results also make it difficult to draw a clear conclusion from these results.

Overall, the inconclusive or contradictory results for the social integration hypotheses suggest that either the theoretical predictions are problematic, or that the study setting did not allow for a fair test of the hypotheses. It is possible that social integration effects take longer to influence the motivation or ability of individuals to engage in innovation efforts. Internships of 8 to 12 weeks may not allow sufficient time for these effects to appear. Furthermore, the emphasis on ego networks limits the ability to understand the full complexity of the social network

structure of an individual (such as network density and centrality), and therefore limits the ability to fully test social integration theories. It is possible that the relationship between social integration and individual innovation efforts are simply weaker or more nuanced, and therefore cannot be identified with the data collected in this dissertation. This suggests the need for alternative approaches to test these predictions. This issue is further addressed in the limitations section below.

CONTRIBUTIONS TO THEORY

Balancing Theories of Integration versus Independence

The primary objective of this dissertation was to help resolve the tension between theoretical perspectives that consider the effects of structural and social integration on innovation efforts. The findings for structural integration do suggest that in fact both enabling and constraining forces work simultaneously, but the effect of integration is closely related to the specific type of innovation effort. For example, the inverted U-shaped relationship between boundary spanning and outward strategy innovation suggests that up to a certain point the enabling forces such as flows from diverse information sources and flexibility associated with models levels of integration are beneficial, consistent with theories highlighting benefit of connectedness (Burt, 2004; Ettlie & Reza, 1992; Howell, & Higgins, 1990; Obstfeld, 2005; Reagans & McEvily, 2003; Ruef, 2002). However, at high levels of boundary spanning (outward integration) the ability of individuals innovate in the outward domain becomes constrained. These effects are only present in the case of the attempts to innovate in the area of marketing, positioning, targeting, or partnering—precisely those areas most closely related to boundary spanning. Centralization shows a similar pattern with respect to process innovations. Here, perhaps the motivating force of top-down involvement with the unit drives a need to attempt to

continuously improve, but when organizations are highly centralized and top-down planning drives the activities and processes of a local unit, the level of individual process innovation drops off. In combination, these findings partially support an integrated theoretical perspective which incorporates both positive and negative predictions and posits an intermediate level of structural integration as optimal for innovation. However, these effects are only evident with innovation efforts in domains apparently closely related to the specific structural characteristic (i.e., process innovation and centralization, and outward strategy innovation and boundary spanning).

The structural integration theoretical view is further enhanced by the consideration of two novel types of integration: (1) the use of outside contract employees and (2) temporary work units (i.e., reduced integration of a unit within a firm across time). The negative effect of utilizing nonstandard employees suggests that integration of employees from other firms (i.e., outward-in integration) hinders innovation efforts related to the core business (product or service) of a firm. However, it appears that the integration of unit within an organization across time does impact innovation efforts, such that units which are known in advance to have a finite life potentially stifle process innovation. In summary, these general structural integration findings suggest that too little structural integration in terms of top-down direction, boundary spanning, or temporal connectedness of a unit, may hinder individual innovation efforts. This supports the idea that integration provides a motivational benefit (Moch, 1980; Bartlett & Ghoshal, 1996) and perhaps beneficial information flows (Reagans & McEvily, 2003) up to a certain point. Once these enabling gains from integration have occurred, other characteristics of integration may constrain such efforts due to complexities and effort associated with managing interdependence (Thompson, 1967) or due to reduced motivation associated with excessive oversight (Barringer & Bluedorn, 1999). Such conclusions must be drawn cautiously, but the nature of the context creates a conservative test of these predictions due to the limited time frame over which these

efforts are measured. Although this can foster confidence in the results that have been identified, further understanding of the underlying causes of these relationships will require additional study.

The non-findings and ambiguous results for social integration limit the ability to contribute meaningfully to theories linking social integration and individual innovation efforts. As highlighted above, there is no clear evidence that higher levels of social integration (whether resulting from physically close working arrangements, or from larger workplace networks) constrain individuals, as predicted in the literature (Lewis & Seibold, 1993; Maitlis, 2005; March, 1991; Salancik & Pfeffer, 1978; Trice & Beyer, 1993; Wecik, 1995). Nor is it clear the social integration—as measured—is providing informational or motivational benefits (Katz, 1964; Moch, 1980; Reagans & McEvily, 2003). Once again, this may be due to the limitations of the internship context. Although this may suggest that the effects of social integration are relatively weak or contingent on factors not addressed in this study, the lack of consistent findings does not allow for definitive commentary on the role of social integration levels in determining individual innovation efforts. Thus, the consideration of competing predictions regarding the effects of social integration must be deferred and reconsidered in future research.

Additional Contributions to Theory

In addition to contribution to theories explaining determinants of innovation efforts, this dissertation makes a number of contributions to other theoretical domains. The development of a more precise definition and operationalization of individual innovation efforts, including the demonstration of distinct areas of such effort, contributes to our understanding of an important and understudied behavior. Rather than considering this as a one-dimensional construct, as has been the approach with other measures developed in the literature (Freese et al., 1996; Morrison & Phelps, 1999), this study provides strong evidence that there are multiple facets to such efforts.

Furthermore, different areas of innovation effort have unique antecedents and different relationships with critical determinants. The direct measurement of these behaviors also enables better understanding of a number of other phenomenon including (1) autonomous strategy, (2) proactive organizational behavior, and (3) organizational change and learning. Below I outline the theoretical and empirical contributions in each of these areas.

First, the initial premise of this study suggests that nonmanagerial employees are potential contributors to organizational adaptation and strategic change, rather than simple resources to be utilized in the accomplishment of directed tasks (Barney, 1991), or anti-change agents that increase organizational inertia (Kimberly & Quinn, 1984). The measurement of attempts specifically intended to influence various aspects of organizational strategies provides evidence that lower-level employees are in fact capable of engaging in bottom-up strategy development (Burgelman, 1983a, 1983b, 1991) and entrepreneurial efforts inside organizations (Lumpkin & Dess, 1996). Although nonmanagerial employees are perhaps best able to influence administrative or incremental innovations at the operating and product strategy levels, this study suggests that they do also attempt influence aspects of strategy which are likely to influence the success of organizations. In particular, the three-factor measure identified demonstrates that strategic innovation efforts among low-level employees are occurring at a measurable rate. These findings suggest that the value of nonmanagerial employees can extend beyond simply executing top-down directed tasks efficiently and effectively. For example, individual innovation efforts may be a critical source of dynamic capabilities within a firm (Zollo & Winter, 2002; Teece et al., 1997), to the extent that nonmanagerial employees can facilitate and stimulate the modification of capabilities and routines. One implication of this finding is that organizations may benefit from the implementation of structures that allow for these efforts to surface and receive organizational support.

Second, this study shifts the traditional organizational behavior (OB) theoretical attention on proactive behaviors from low-level (individual or group-level) outcomes to the domain of organizational-level phenomenon by making a conceptual linkage from individual behaviors to organizational learning and strategic change. In addition to the primary contribution of these conceptual linkages, it empirically extends the OB perspective by considering structural and social integration mechanisms at organizational-levels as predictors of individual-level behavior. The antecedents considered in this study are a unique set of contextual predictors, as well, that have not been thoroughly considered in the OB literature (cf. Organ & Ryan, 1995) and that address calls for meso-level approaches in the study of individual behavior in organizations (Cappelli & Sherer, 1991; House, Rousseau, & Thomas-Hunt, 1995; Shalley, Zhou, & Oldham, 2004). The empirical consideration of integration mechanisms also provides another bridge to strategic management literature, in which integration is receiving increased attention (cf., Gulati, Lawrence & Puranam, 2005). The connection between integration mechanisms and individual innovation efforts similarly enriches the stream of work examining integration, which has focused on group or organizational outcomes and conceptual or qualitative approaches (Dougherty, 2001; Foss, 2001).

Finally, this study provides a novel test of theories of organizational change and learning (March, 1991) which, although compelling, have suffered in terms of perceived usefulness due to a paucity of empirical attention and evidence (Miner, 2003). Such theories explicitly predict that individual contributors in the organization are critical sources of variation in routines, yet little is known about exactly how frequently this may occur, and the antecedents of such change are not clearly defined. This examination of individual innovation efforts offers empirically grounded examples of such behaviors. Furthermore, studying these efforts at the lowest levels of the organization contributes to our understanding of the basic nature of the phenomenon. As

highlighted above, however, a more thorough test of the predictions from these theories will be an important future step.

CONTRIBUTIONS TO PRACTICE

New insights into mechanisms that are able to influence the level of individual innovation effort among employees are the primary potential contribution to managerial practices. The topic of motivating and encouraging creativity, innovation, and change below the executive level has been frequently addressed over the past several decades in practitioner literature, with books such as *The Innovation Ethic* (Mueller, 1971), and Kanter's (1983) early work, *The Change Masters*, and more recent titles such as *Catalysts for Change* (Rouse, 1993), *Mavericks in the Workplace* (Lee, 1998), *Leading the Revolution* (Hamel, 2000), *Creating the Innovation Culture* (Horibe, 2001), and *Business Creativity* (Gogatz & Mondejar, 2005). Many articles with a similar focus have appeared in *Harvard Business Review*, *Sloan Management Review*, and other practitioner outlets, and the readers appear to be listening. Letters to the editor include comments such as "More than ever, companies need creative people in their ranks.... To achieve a fully creative organization, however, they will have to be able to recognize and manage the informal creative work of their employees" (Poirier, 1998: 170). Similarly, contributors have shared stories highlighting attempts to leverage individual innovation efforts, such as one of plant managers in Germany turning to workers to determine how to improve efficiency, rather than imposing a plan top-down (Gnamm & Neuhaus, 2005).

These and many similar publications suggest a deep thirst among managers for specific recommendations to improve the level of proactive contributions among lower-level employees. Although some works draw on academic research (most often qualitative), empirical evidence demonstrating a link between mechanisms that managers can influence and individual change

oriented behaviors is lacking. This study provides some additional understanding of structures and systems that can be established by managers and executives in order to enhance, or reduce change behaviors, depending on the needs within the organization. For example, modest levels of centralization are optimal for process innovation efforts. Similarly, a modest level of boundary spanning at the unit level is also likely foster the highest level of individual engagement in efforts to influence outward marketing and alliance strategies. The findings also highlight the potential downside of excessive reliance on contract employees in units where product development occurs or where innovation directed toward modifying the core products or services of a company is desirable. Furthermore, temporary work groups appear to be best suited for efficient exploitation of well developed routines and strategies, rather than areas for innovation and exploration. Similarly, evidence suggests that managers seeking to foster proactive innovation efforts related to core strategy innovation may want to foster interaction among functionally-diverse individuals in the workplace.

Although empirical evidence from this study regarding the moderating effect of individual personality and experience characteristics is somewhat unclear, it does highlight the need to consider individual characteristics. Managers seeking individual innovation efforts will benefit by screening potential employees to find those with more proactive personality traits generally, as well as a broad functional background (perhaps even if the depth of such experience is limited). When such experience is not already present, it could be further developed through rotational assignments. This reinforces the value of common job rotation systems for new hires practiced in many firms. Even simply having a greater awareness of this phenomenon may assist managers who seek higher levels of innovativeness within their organization, to the extent that lower-level employees may be an untapped innovation resource.

LIMITATIONS & FUTURE RESEARCH DIRECTIONS

The contributions to theory and management practice outlined above suggest the relevance, importance, and timeliness of this research. However, it is a first step in the exploration of organizational-level determinants of individual innovation efforts. A number of other important research questions remain, and as with all research efforts, there are a number of limitations present in this study.

The development of a more comprehensive measure of individual innovation efforts has contributed to the understanding of the domain specificity of such innovation efforts; however it is still limited in its focus. For example, the measure is essentially a count of efforts initiated. It does not measure the quality or effectiveness of such efforts. Understanding the outcomes of these efforts is a critical next-step, including the ultimate effects of integration on the quality of innovation efforts, rather than just quantity. It is possible that the count of efforts and the quality are not positively correlated. For example, individuals who focus a great deal of energy on one effort may be more likely to succeed in coming up with a valuable innovation that is more likely to be accepted and utilized in the organization.

In considering the nature of the innovation efforts, it will also be useful to examine the scope of any innovation. This may moderate the relationship between integration and innovation effort outcomes. For example, purely local efforts to innovate and change processes contained within a unit are less likely to be influenced by structural integration (and cross-unit integration in particular). Larger scale innovations which impact multiple groups or domains are more directly impacted by structural integration factors. This suggests the need to further refine the measurement of individual innovation efforts to actually capture specific details about each effort, such as the scope of the effort and how far reaching the impacts of the innovation may be.

Although the internship setting is ideal in many ways, it does have several limitations. Most importantly, the short-term nature of internships may have limited the ability to fully measure and thoroughly test the effects of social integration forces. Clearly the link between social integration and individual innovation efforts will require additional future exploration. Thus, to fully inform our understanding it will be important to test for such effects with longer-term employees or with better measures of social integration. Although the limited time-frame and temporary nature of internship positions does create a conservative test, and provide greater confidence in the relationships that have been demonstrated, it may be difficult to generalize from these findings to long-term employees in firms. Thus, the findings that have emerged are more likely to be relevant to other newcomer contexts. In other long-term employment cases, other relationships which were not significant in this model may emerge as significant. This limitation suggests the need for the study of individual innovation efforts in greater depth among low-level employees within a single firm, or group of several organizations. Such efforts are already underway, and will further enhance understanding of this phenomenon.

The cross-sectional nature of some of the data in this study also presents a limitation. For example, network measures were collected at the same time the innovation effort measure was captured (out of necessity). Although the measures are different enough that common method bias or demand effects are unlikely, it is impossible to entirely determine the causal direction between innovation efforts and network characteristics. Furthermore, the use of only ego networks, as opposed to complete network data for units, limits the ability to consider individual network measures for individuals such as centrality, or structural measures for the unit as a whole (such as network density). Future in-depth studies inside organizations, examining full networks, will be necessary to address such issues.

A primary question arising from this study is the appropriateness of such individual innovation efforts in various organizational and environmental (i.e., industry) contexts. The limited ability to explicitly measure how receptive the organization is to these individual innovation efforts behaviors, and the long term impact of such behaviors, are limitations in this study. There are likely situations in which individual innovation efforts attempts may be unhelpful distractions from the performance of the primary task at hand. For example, in a very sophisticated production environment, such as a semiconductor plant, individual attempts to modify routines could have negative consequences. It is likely, however, that organizational contexts such as this, where individual innovation efforts may be harmful, have built-in safeguards (e.g., strict protocol and processes for introducing change). Nevertheless, a better understanding of the specific contextual contingencies that influence the value of individual innovation efforts would be extremely useful. Future studies of supervisor perceptions of the presence and value of such behaviors will be a starting point.

It would also be useful to consider industry effects which influence the value of such efforts. For example, industries characterized by turbulence and a high degree of change (cf. Eisenhardt & Bourgeois, 1988) may be best suited to benefits from individual innovation efforts in core or outward strategy areas to the extent that low-level employees are attuned to market needs. On the other hand, individual innovation efforts in process areas that tend to be more incremental may be most valuable in stable industries (cf. Fredrickson, 1984). There may also be a number of additional important organizational characteristics that could be considered in beyond those addressed in this study. For example, labor union involvement may significantly inhibiting initiative through the emphasis on formal work-rules and restrictions on the ability of individuals to modify those rules.

Further exploration of how innovations initiated among nonmanagers diffuse throughout the organization, and how individual innovation efforts specifically influence group and organizational outcomes, such as learning and change, are also critically important. Future field studies that simultaneously study individual innovation efforts, as well as championing behavior (Day, 1994; Shane, Venkataraman, & Macmillan, 1995; Howell, Shea & Higgins, 2005) could serve as a starting point to increase our understanding of the diffusion process. For example, we might explore how champions can effectively identify and promote ideas that emerge from individual innovation efforts. It will also be important to understand how perceptions of managers influence the ultimate outcomes of individual innovation efforts. For example, regardless of how appropriate or valuable a change or innovation may be, supervisors or managers may perceive it as unwelcome or threatening (Klein, 1984). Because the benefits of individual innovation efforts are unlikely to be fully realized without higher-level (managerial) structures in place to facilitate the free flow of ideas and initiatives, a better understanding of the entire process will be an important avenue for future research. This will also likely require a longer-term approach where the outcomes of innovation efforts can be tracked. It will also require inclusion of group processes and dynamics, because once the effort is initiated, the adoption and diffusion are much more likely to be driven by such factors.

The connection between individual innovation efforts and managerial behavior has significant implications for the outcomes for the individuals who demonstrate initiative. These individual-level outcomes are also of significant interest. Although job-satisfaction and extrinsic rewards (such as impact on pay raises, or likelihood of promotion) are important outcomes, more interesting, longer-term outcomes include the influence of such behaviors on the individuals ability to ultimately rise to executive positions, where they will have more direct influence over strategic change, decisions, and initiative. Research linking individual innovation efforts to such

outcomes, similar to studies that have examined the link between proactive personality and career outcomes (Seibert, Crant, & Kraimer, 1999; Seibert, Kraimer, & Crant, 2001) could help improve our understanding of career advancement and the early-stages executive careers. On the other hand, individual innovation efforts may lead to negative individual outcomes, such as lower relative pay or even dismissal, should such behaviors be viewed negatively in the organization (cf. Crant, 1996a). Managerial behaviors such as taking-credit for ideas may also influence the perception of procedural justice, and have other individual-level outcomes such as increased likelihood of exit. Even without such injustices, individual innovation efforts behaviors may be predictive of voluntary exit as individuals most likely to demonstrate individual innovation efforts depart to pursue a more entrepreneurial path, as suggested by Crant (1996b).

In summary, the number of potential avenues for future research highlighted above suggests ample opportunity to increase our knowledge in a variety of theoretical areas in management and strategy. Building on this study, future research can improve our understanding of the outcomes of individual innovation efforts at the individual, group or organizational levels, and help academics and practitioners understand how to maximize the benefits of individual innovation efforts.

TABLES & FIGURES

TABLE 1: Individual Innovation Effort Domains

<i>Innovation Area</i>	<i>Target of Innovation Effort</i>	<i>Possible Outcomes</i>
Administrative or Operational	<ul style="list-style-type: none"> • Improve one’s own work practices/processes • Change practices at the work-unit level, or organization-wide (e.g., planning, control, design, production, etc.) • Change organizational policies • Elimination of processes or routines • Introduction of new technologies or systems • Alter HR practices (e.g., hiring & compensation) • Alter job functions or work unit responsibilities • Alteration of supplier relationships and purchasing practices 	<ul style="list-style-type: none"> • Greater efficiency/productivity • Reduced waste or errors • Improved effectiveness (tasks accomplishment) • Solutions to ongoing problems • Lower costs
Product/Business	<ul style="list-style-type: none"> • Changes to product features or designs • Alter pricing, positioning, or marketing strategies • Addition of products/services to existing lines • Alter sales or distribution channels and strategies • Enhance or change customer service and support • Entry into a new market segment or geographic market 	<ul style="list-style-type: none"> • Revenue growth • Improved margins • Improved market-share • Improved market positioning • Improved overall financial performance
Corporate	<ul style="list-style-type: none"> • Entry into a new business area • Exit a business or drop a product/service • Alter financial strategies • Initiation of a new alliance or partnership • Initiate an acquisition or spin-off 	<ul style="list-style-type: none"> • Revenue growth • Improved margins • Improved market-share • Improved market positioning • Improved overall financial performance

TABLE 2: Individual Innovation Effort Examples

<i>Setting</i>	<i>Employee Level</i>	<i>Innovation Effort Example</i>	<i>Potential Impact</i>
High-tech manufacturing	Entry-level technical staff (engineering)	Without request, developed new software to dramatically speed a testing process. Adopted and introduced to other managers once developed.	Cost reduction through process efficiency & reduced product defects
High-tech manufacturing	Entry-level staff (marketing)	Approached manager several times to discuss new business ideas, both related to and outside their department	Increased sales through new product/business strategy
International wholesale	Entry-level staff (operations)	Developed order/invoice management system to automate manual processes	Cost reduction through process efficiency
Logistics & transportation	Entry-level staff (operations)	When asked to evaluate a new time-card system, also suggested ways to improve attendance and fairness.	Cost reduction through improved employee productivity
Management consulting	Senior entry-level (consultant)	Used personal acquaintances to initiate discussions of joint sales efforts with another complementary consulting firm.	Increased sales through new sales & alliance strategy
Higher education (university)	Entry-level (junior faculty)	Developed concept, acquired resources & partners, and launched new academic conference	Enhanced reputation & visibility for organization
Financial services	Mid-level staff (financial trading)	Researched and pursued alternative methods of developing an automated trading system based on mathematical models.	Increased profits through improved trading
High-tech manufacturing	Front-line manager (information systems)	Developed business plan for consulting offering building on unique IT expertise within the company.	Increased sales through new business strategy
Non-profit organization	Organizational member (volunteer)	Developed web-based directory of members, including system to allow recruiters to search members based on experience and interests.	Expanded organizational mission, member benefits
Higher education (university)	Entry-level (junior faculty)	Initiated a weekly brown-bag discussion meeting among faculty and doctoral students.	Development and improvement of research ideas & projects
Higher education (university)	Entry-level (administrative)	Introduced a policy of routine reminders of upcoming deadlines (e.g., registration) for doctoral students	Cost and time savings

FIGURE 1: Model Overview

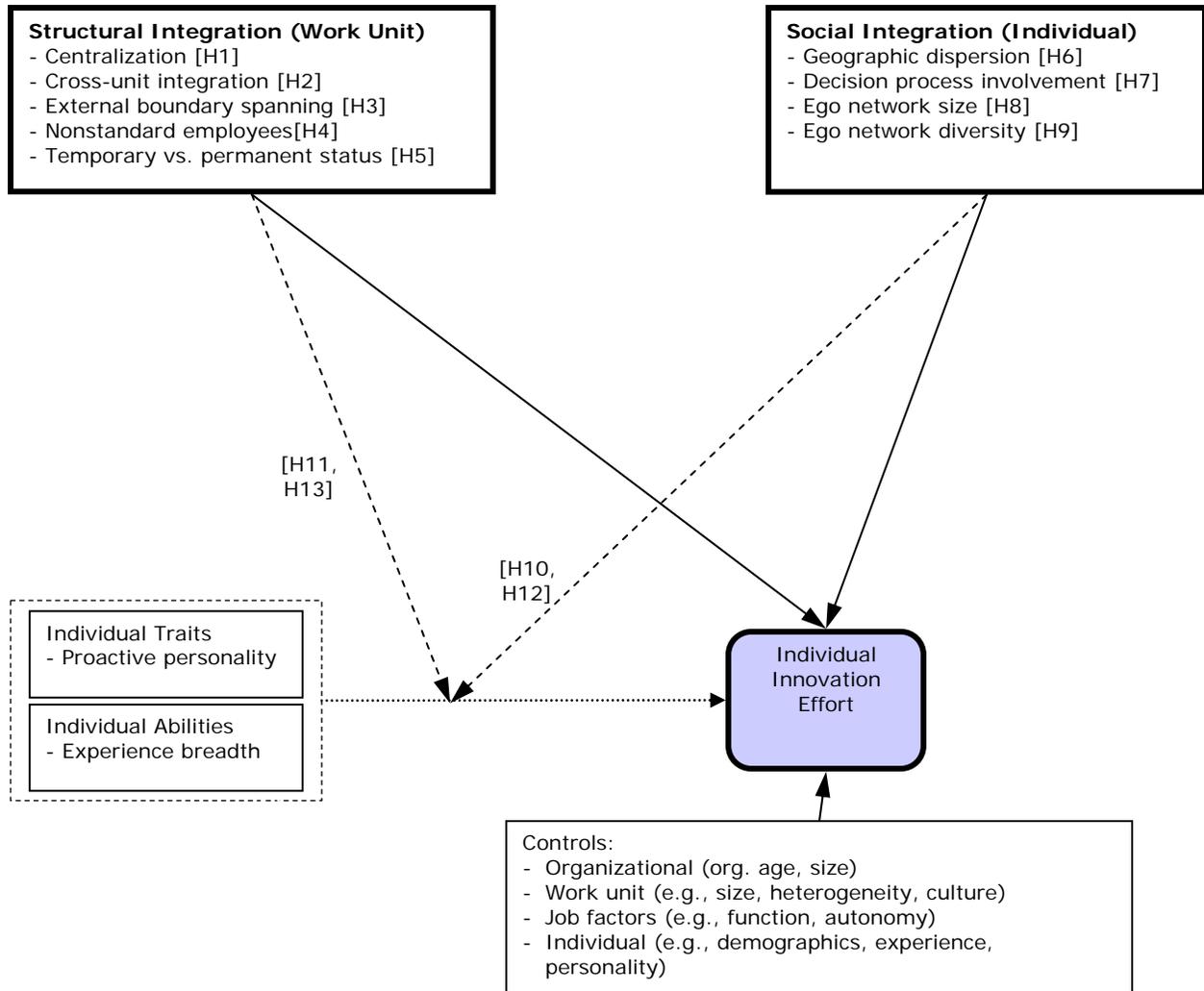


TABLE 3: Individual Innovation Effort Related Constructs
(cf. Rank, 2004; Spreitzer & Sonenshein, 2004; Van Dyne et al., 1995:265)

<i>Construct</i>	<i>References</i>	<i>Overlap with Indiv. Innov. Effort</i>	<i>Distinction cf. Indiv. Innov. Effort</i>
Organizational Citizenship Behavior (OCB)	Van Dyne, Cummings & Parks, 1995; Organ & Ryan, 1995	Behaviors likely to be beneficial to the performance of the organization, in many cases extra-role.	Indiv. innov. effort explicitly focuses on change-oriented behaviors that have the potential to influence organizational routines.
Proactive personality	Bateman & Crant, 1993	Tendency to take action to influence one's environment.	Indiv. innov. efforts reflects behaviors in context, rather than a personality trait.
Advocacy participation	Van Dyne, Graham, & Dienesch, 1994	Behaviors which foster or encourage organizational change.	Advocacy participation emphasizes voice behaviors, rather than actual attempts to introduce specific changes.
Personal initiative	Frese et al., 1996	Self-starting, proactive, and persistent behaviors, with an emphasis on long-term impacts.	Indiv. innov. effort incorporates more strategic change efforts (e.g., product or marketing strategy).
Taking charge behavior	Morrison & Phelps, 1999	Self-directed attempts to change organizational routines & processes.	Indiv. innov. effort incorporates more strategic change efforts (e.g., product or marketing strategy).
Improvement oriented voice	LePine & Van Dyne, 1998	Directed toward beneficial organizational changes in routines or practices.	Indiv. innov. effort captures attempts by individual to implement change, or actively work to encourage implementation by others
Suggestion making	George & Jones, 1997; George & Brief, 1992	Directed toward beneficial organizational changes in routines or practices.	Innov. effort captures attempts by individual to implement change, or actively work to encourage implementation by others
Issue selling	Dutton & Ashford 1993	Attempts to influence outcomes within the organization	Issue selling is focused on influencing the issues others pay attention to, and how they interpret those issues, without an explicit emphasis on actual change efforts.
Entrepreneurial behavior	Hisrich, 1990	Behaviors demonstrating initiative and creativity in order to generate value from resources in new ways.	Entrepreneurship is typically market oriented and externally directed, and does not consider changes to internal processes or routines.
Creativity	Amabile, 1988	Involves the development of novel concepts or ideas.	Indiv. innov. effort extends beyond having ideas, and requires actual action to promote and attempt to implement such ideas.
Innovation	Amabile, 1988; Scott & Bruce, 1994	Reflects the adoption of novel or creative ideas in an organization by an individual.	Classic innovation research often focuses on organizational level outcomes, rather than individual behavior. Innovation also emphasizes successful implementation, rather than the initiation of change.

FIGURE 2: Structural Integration Determinants

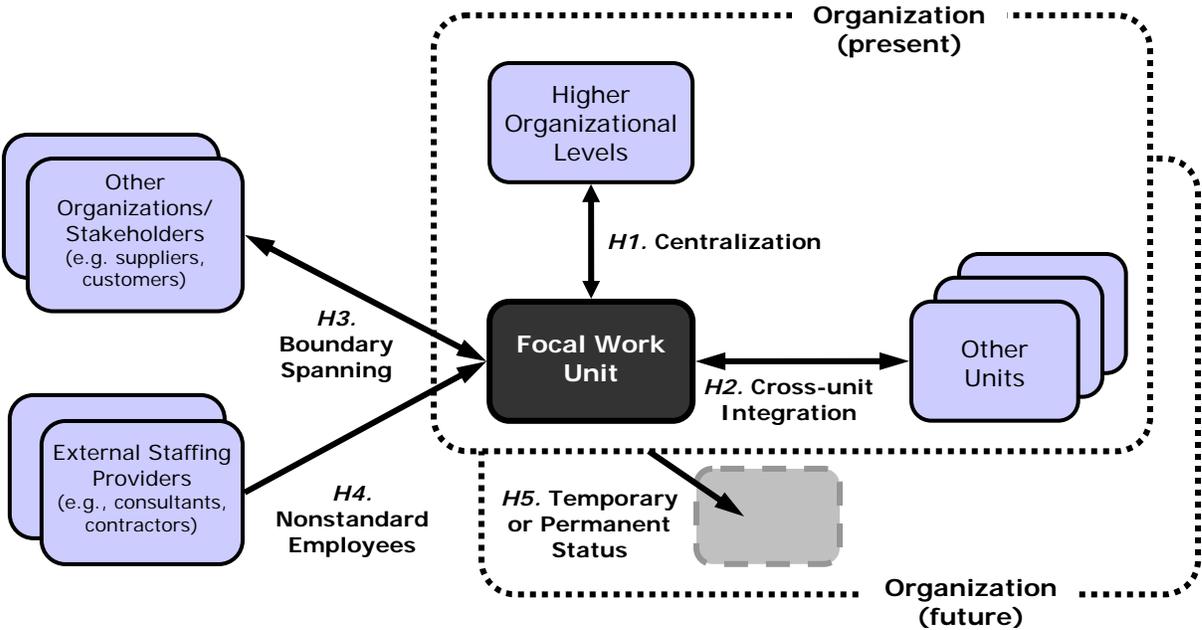


FIGURE 3: Social Integration Determinants

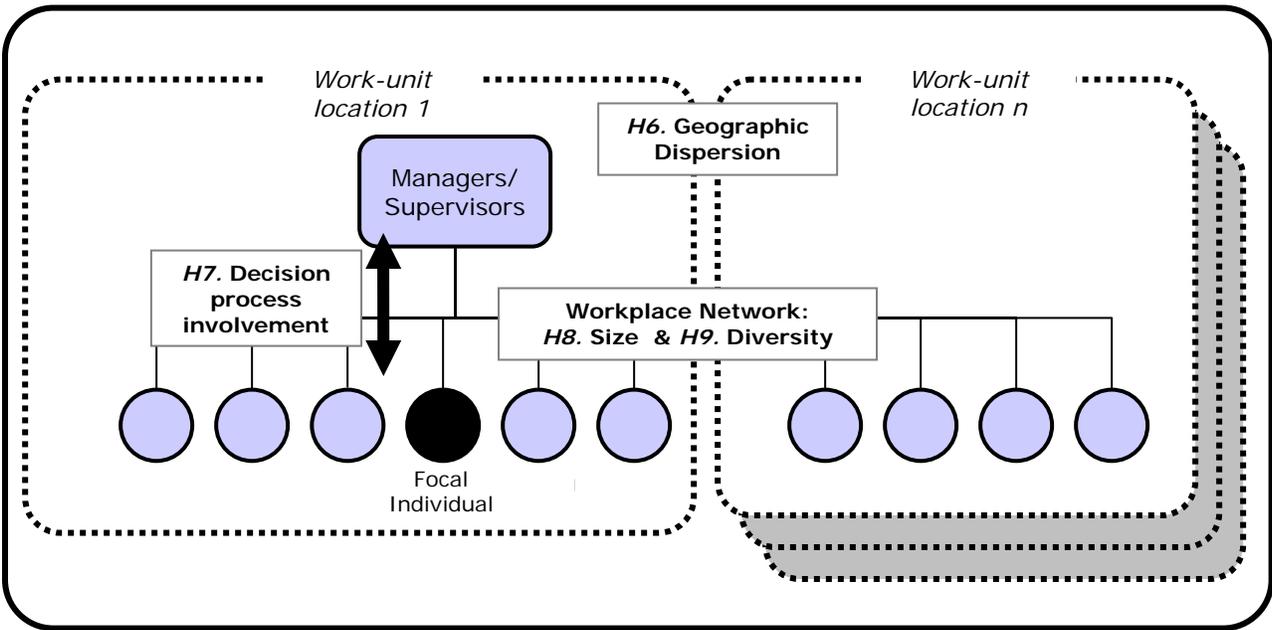


FIGURE 4: Diagram of Hypothesis 10

Proposed interaction between personality
& process involvement

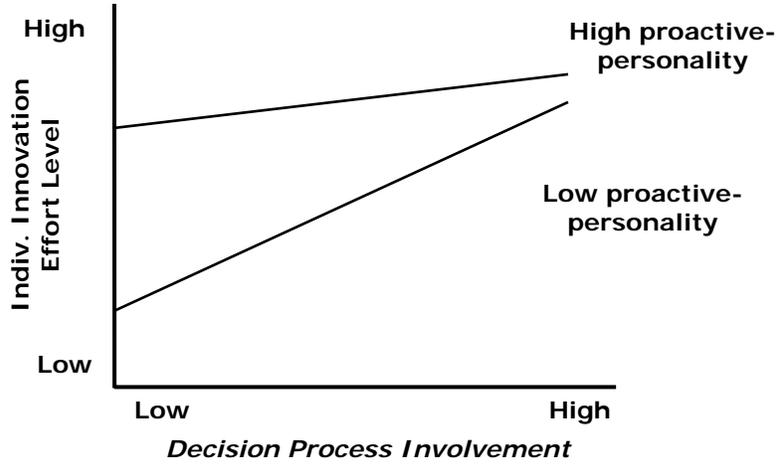


FIGURE 5: Diagram of Hypothesis 11

Proposed interaction between personality
& cross-unit integration

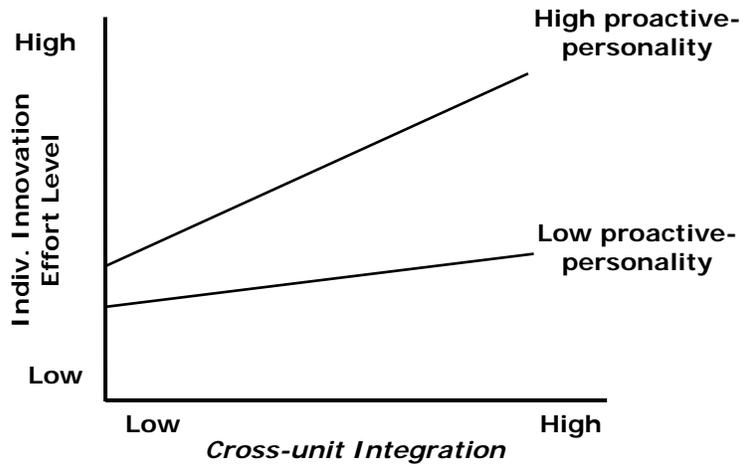


FIGURE 6: Diagram of Hypothesis 12

Proposed interaction between experience breadth & process involvement

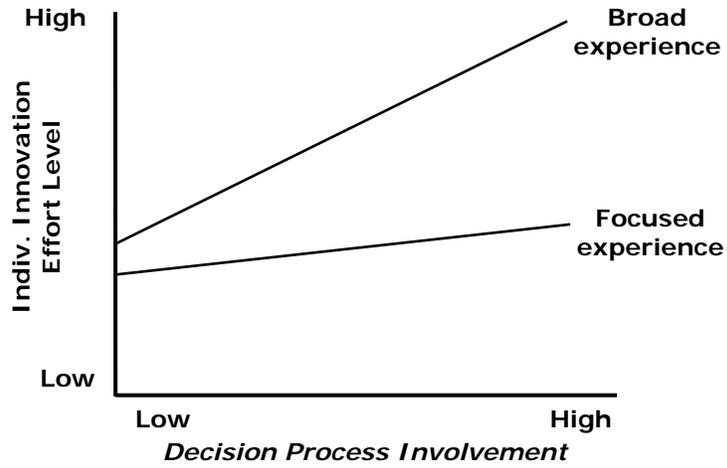


FIGURE 7: Diagram of Hypothesis 13

Proposed interaction between experience breadth & cross-unit integration

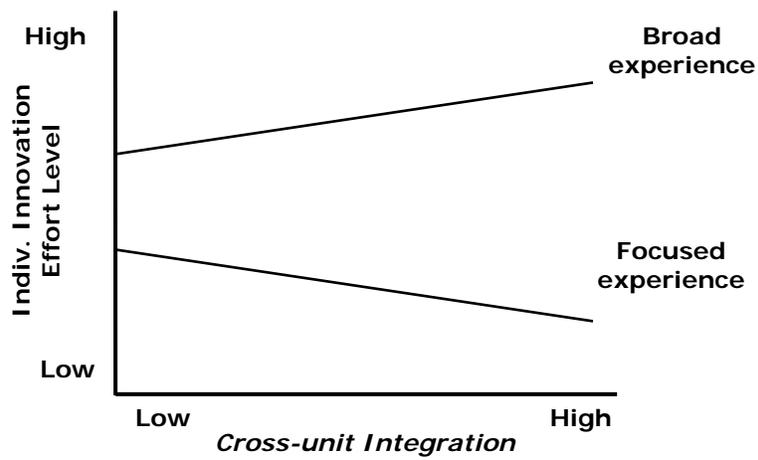


TABLE 4: Variables, Measures & Data Sources

Type	Variable	Measures	Data Source
DV	Individual Innovation Effort	13 items; 6 items from Morrison & Phelps (1999), 7 items newly developed <i>[Note: separated into three DVs: process, core strategy, outward strategy innovation efforts]</i>	Intern (survey 2)
IV (Structural integration)	Centralization	4 items adapted from Birkenshaw et al. (2002)	Supervisor
	Cross-unit integration	6 items drawn from Miller (1987), Birkenshaw et al. (2002), and Zahra & Nielsen (2002)	Supervisor
	Boundary spanning	4 items adapted from Leifer & Huber (1977)	Supervisor
	Blended work arrangements	2 questions, adapted from National Organizations Study (NOS) measures (Kalleberg et al., 1996)	Supervisor
	Permanent/ temporary status	Binary indicator (temporary/permanent) plus anticipated lifespan (months)	Supervisor
IV (Social integration)	Geographic dispersion	New measure categorical measure (also open ended question regarding percent remote employees)	Supervisor
	Decision process involvement	Four items based on Barringer & Bluedorn (1999) and Fredrickson & Mitchell (1984)	Supervisor
	Ego Network Size	Count of workplace ties, generated using open-ended name generator (cf. Ibarra, 1995)	Intern (survey 2)
	Ego Network Functional Diversity	Count of alters outside interns functional area (from network survey instruemtn)	Intern (survey 2)
IV (moderation)	Proactive personality	12 items from Bateman & Crant (1993)	Intern (survey 1)
	Breadth of experience	Sum of experience level across 8 business functional areas. Alternative measure utilized count of prior work/extracurricular activities, adapted from Bateman & Crant (1993)	Intern (survey 1)
Controls	Organizational age	Years since founding of organization	Supervisor
	Organization size	Total employees, organization-wide	Supervisor
	Work unit size	Number of full-time employees in unit	Supervisor
	Functional heterogeneity	Entropy based measure, distribution across 7 functional areas (Ancona & Caldwell, 1992)	Supervisor
	Tenure heterogeneity	Coefficient of variation of time in work unit	Supervisor
	Support for innovation	5-item measure (Scott & Bruce, 1994; Morrison & Phelps, 1999)	Supervisor
	Internship functional area	Categorical (sales/marketing, accounting, etc.)	Archival
	Internship hierarchical level	Self-report categorical measure of level of managerial and supervisory responsibility	Intern (survey 2)
	Internship duration	Length of internship in weeks (calculated)	Intern (survey 2)
	Compensation	Weekly pay	Archival
	Hours worked per week	Open ended question	Intern (survey 2)
	Job autonomy	3 items adapted from Hackman & Oldham (1980)	Intern (survey 2)

(continued on following page)

TABLE 4: Variables, Measures & Data Sources*(continued from previous page)*

Type	Variable	Measures	Data Source
Controls (continued)	Supervisor feedback	2 items adapted from Hackman & Oldham (1980)	Intern (survey 2)
	Task interdependence	1 item adapted from Hackman & Oldham (1980)	Intern (survey 2)
	Psychological safety	3 items adapted from Ashford et al. (1998)	Intern (survey 2)
	Job Satisfaction	7 items based on Brayfield & Roth (1951)	Intern (survey 2)
	Prior contact with firm	3 category measure	Intern (survey 1)
	Age	Age in years, open ended	Intern (survey 1)
	Gender	Binary measure (1=female, 0=male)	Archival
	Ethnicity	Categorical measure (Caucasian, African American, etc.)	Intern (survey 1)
	Non-U.S.	Binary measure (1=nationality other than US)	Archival
	Years work experience	Self-report, open ended	Intern (survey 1)
	MBA	Binary measure (1=MBA, 0=undergraduate)	Archival
	Major	Categorical (finance, management, etc.)	Archival
	Conscientiousness	8-item measure (Saucier, 1994)	Intern (survey 1)
	Openness	8-item measure (Saucier, 1994)	Intern (survey 1)
	Job risk preference	6-item measure (Cable & Judge, 1994)	Intern (survey 1)

TABLE 5: Individual Innovation Effort Measure Items and Factor Loadings^a

Item	Process Innovation Effort	Core Strategy Innovation Effort	Outward Strategy Innovation Effort
1. I tried to change how my job was executed in order to be more effective [‡]	.79	.02	.12
2. I tried to bring about improved procedures in the work unit [‡]	.79	.26	.14
3. I tried to institute new work methods that would be more effective for the company [‡]	.68	.48	.05
4. I tried to correct a faulty procedure or practice ^{b‡}	.49	.59	-.07
5. I tried to introduce new systems or technologies to improve efficiency [‡]	.18	.74	.02
6. I tried to introduce new or improved product or service ideas	.03	.73	.39
7. I proposed changes to existing products or services	.20	.59	.35
8. I tried to implement changes in pricing, promotion, sales, or other marketing activities	.10	.20	.77
9. I proposed expansion of operations or sales into new geographies or market segments	-.09	.28	.72
10. I tried to develop or improve relationships with other organizations (i.e., suppliers, clients, partners)	.34	-.12	.68

^a Rotated factor loadings based on full sample of individual responses ($n = 812$). Factor loadings are similar using only responses in final models ($n = 355$)

^b Item four not included in final measures due to cross-loading.

[‡] Items directly adapted from Morrison & Phelps (1999) “taking charge” measure

TABLE 6: Sample Innovation Effort Examples Reported by Individuals

Type	Group	Example
Process	MBA	Encouraged a new process for indentifying new companies for incubation and criteria for admittance.
Process	MBA	I improved communication by having engineers talk directly to suppliers.
Process	MBA	I was asked to use some data that was given to me to form a report to be distributed. In the process, I realized that the data had many errors. I contacted the consulting company and worked with them to correct the errors. I then rewrote the survey (source of the data) because of some faults that I had identified with it.
Process	MBA	I worked to make the financial model more usable by senior management... who did not necessarily know how the model worked. I put in rules into the spreadsheet that prevented incorrect entries.
Process	UG	Automated a sales relationship model process and then improved upon it with follow on sales using VBA code in Microsoft Excel.
Process	UG	I tried to reduce the amount of intern events that required mandatory attendance and convince my group to not require me to go as it took away too much time from the office.
Process	UG	The company was having problems with a procedure known as research where team members look for merchandise that is missing from the floor. I suggested that team members look in the backroom and do a little more research than just depending on the merchandise on the floor and taking the easy way out.
Process	UG	I came up with a word document outlining the procedure for giving out tickets to our major donors in order to fix the problem of miscommunication between departments.
Process	UG	The way we organized our commercial client information was very disorganized and I took initiative and reworked the system to make it more accessible and organized.
Process	UG	I tried a few different processes of registering campers in order to find the most effective method.
Process	UG	I created a 'how-to' for working the Polling desk for future trainee's.
Process	UG	My supervisor had showed me a specific procedure for doing monthly collection spreadsheets that seemed to me to take forever. After a few minutes of experimenting in Excel, I found a much more efficient way of bringing in all the information that saved me a lot of time.
Process	UG	I created a database that allowed the president and senior research analyst to automatically download, sort, and quantify company performance. This helped my boss because it organized his information of specific companies on an aggregate level as well as gave him an easy-to-read worksheet design that he could then use when talking to clients.
Process	UG	I suggested and implemented the installation of a wireless network in the office.
Process	UG	I started a catalog and an organization structure for the prospectus room that could be updated and referred to at any time. Before there were just piles of papers on the floor.
Process	UG	I developed a strategic vendor management plan that allowed our company to reduce the number of contracts we had with vendors from more than 700 to 150.
Process	UG	When I thought that the way of organizing files was difficult and wasted time, I suggested a change in the filing system that was accepted. I reorganized the system and saved many employees time and effort.
Process	MBA	I met with 25+ people on my own to develop a service cost library and worked throughout the organization to garner support for it.
Process	MBA	I introduced them to a leading edge research software that would improve efficiencies and save managers time.
Process	MBA	In calculating a risk, I insisted on using an advanced software which would save my team's time drastically. In fact it did.
Process	UG	I helped make Google Earth the standard program for mapping Area Overviews. A less efficient system had been used, and my knowledge and application of Google Earth streamlined the process.
Process	UG	One of the forms required to open an account at [company] was hard to follow. Numerous clients missed signatures on the form. This delayed the time it took for us to approve the account and make it live. Since I was in charge of calling people about missing signatures, I made many phone calls about this one form. I went to my boss and suggested that we redo that form to make it more readable. Therefore, people would fill it out correctly the first time. Once I brought it to his attention, everyone agreed.

(continued on following page)

TABLE 6: Sample Innovation Effort Examples Reported*(continued from previous page)*

Type	Group	Example
Process	UG	While, researching discovery documents I developed a faster way of coding documents using broader search terms.
Process	UG	One of our clients was given a list of company stocks that were available to invest in through their 401k, and my supervisor asked me to print out research reports on all the stocks. I then asked my boss if I could formulate a spreadsheet that would quantify and compare the pertinent data on the research reports so that she could make her advising decision more efficiently. She agreed, and I saved her time by organizing the information in a logical and efficient way.
Process	UG	In order to streamline the creation of the stat account reports every month I built Access queries and reports to generate the reports automatically through Access databases, which cut the time down by about 4-5 hours of work
Process	UG	I automated a datatape checking procedure that saved the company a day or two in FTE time, as well as several thousand dollars a month.
Process	UG	In one of the more tedious processes of my internship, the current way to input a certain kind of data into the system seemed redundant. I was able to change the way that they performed in this area to make it more efficient.
Process	UG	I came up with a new model to evaluate [company's] Inventory located in the Operations Department. The new way I tracked and evaluated the inventory allowed Operations to cut out old inventory that had been sitting in the back for over 1 year and reduce total inventory by half in just one month.
Process	UG	When changing bandages, instead of everybody moving as a group, I suggested we each change individual patients' bandages. This led to much less time spent changing dressings and made the overall process more efficient.
Process	UG	At [company] they employ 'rental' employees for a year. [Company] pays an outside company for their wages. When I started my internship they were behind in payments for over a year. So I cleared up all the past payments and helped put in a process so this would not happen again.
Process	MBA	I worked with the lead counsel to understand the lease procurement process and design a simple tool to streamline that process in the field and free up time for management.
Outward	UG	I started a promotional offer for the company that gave [company] shirts and animal collars away to our clients. It was not only a great way to show our appreciation to our customers, but also proved to be a great way to market to potential clients.
Outward	UG	On a new book that we were marketing to a very specific market, I suggested that we start contacting gift stores and museums to reach that market more effectively. The company did end up targeting such entities.
Outward	UG	After calculating the cost per unit of some of our products, I realized that the company was charging too low a wholesale price in order to earn a substantial margin. I showed the numbers to my supervisor with proposed prices that would allow the company to earn a higher margin while maintaining a competitive price.
Outward	UG	I developed a partnership between the company and [a local] Magazine.
Outward	MBA	Started a climate change inter-agency working group to coordinate climate change initiatives mission-wide.
Outward	MBA	I used my personal network to connect with Indian Venture Capital firms.
Outward	UG	I established several connections with possible buyers and improved relationships with several distribution representatives.
Outward	UG	I suggested new locations to open another [retail location]
Outward	UG	I tried to diversify our advertising clients by branching out into industries like auto dealerships.
Outward	UG	My supervisor gave me a chance to bring my own deals to the table, and I took the opportunity to call my relatives in China for potential investment opportunities.
Outward	UG	I was able to leverage my personal relationships /w some companies in order to help get an entry door for some of our outside sales staff
Outward	MBA	I proposed entering a trade show as an exhibitor in a foreign market, introducing our products to a large percentage of it.
Outward	MBA	As part of my project, I suggested several new markets for them to consider entering - dairy (snacks) such as yogurt, yogurt snacks, string cheese and cheese snacks.

(continued on following page)

TABLE 6: Sample Innovation Effort Examples Reported*(continued from previous page)*

Type	Group	Example
Core/ Outward	MBA	During my summer internship at [company] I identified an underserved market (Hispanic consumers) for one of [company's] products, and changed the packaging and distribution to more effectively target Hispanic consumers in Wal*Mart
Core/ Outward	UG	I proposed that the pricing of products become unified, and that they throw out the products which did not have much customer appeal for ones that did.
Core	UG	Since this is a software company, figuring out how the application works takes time. While testing it, I came up with enhancements that could probably make the application work better.
Core	UG	One of my projects was to create simple fact sheets about competitors, but I added much more, like Quick Facts and pictures of products
Core	MBA	Developed a solar power initiative for my company.
Core	MBA	Within the business plan I created for [retail product company], I recommended entry of the brand into a new category (which was not an expected outcome of my project).
Core	MBA	Created a new product concept for [company]. The new concept has begun the process of becoming a new product.
Core	UG	My boss wanted to just show our customers a list of area attractions of San Diego for a customer conference, but I made a whole brochure with pictures and an extra dining guide with price key.
Core	UG	While developing the food-related product for [company], I suggested and implemented an entirely new feature to the product enhancing its user-friendliness. This feature consisted of a list of the tools needed in each recipe.
Core	UG	I suggested a design for the packaging of a new product. The design made it into production.
Core	MBA	Throughout the entirety of my project I made suggestions to the company about how they could improve a certain category of product - downloadable software - to better compete in the market. I thus made a lot of recommendations about small things that should be changed as a part of an overall revamp of the product offering.
Core	MBA	I saw a potential opportunity for the private wealth division to work with the insurance unit on a new product idea and independently worked to determine whether this idea had potential and who the target client segment should be.
None ^a	UG	I was given a lot of freedom to complete tasks any way that I saw fit. I did not see the need to change many things, because I was allowed to do them the way that I thought best.
None	UG	[Leading investment bank] is an extremely streamlined company and all of the tasks I was given had certain ways to complete them and each time I found the suggestions on how to complete them to be the most efficient.
None	UG	My work was very structured and regulated. The tasks I was assigned fell into a greater picture, and I really did not take any initiatives during the internship.
None	UG	I agreed with the way things were run, so had little reason to ask for change or suggestions. I also tried to be thorough in my work and tried complete me tasks in an efficient manner that helped me get the job done in the best way.
None	UG	Many of the systems both practices and technology were very rigid at the company I worked for this summer because it was a huge bulge bracket firm. I did spend a bit of time working on researching local economies for own of our clients where I compiled information and then presented to my supervisor in a bound book.
None	UG	I feel that all these things are taken care of at higher levels of the organization. What the company tells its sales managers to do is what works at our level. With the clients I just always presented myself as a conservative college student. I always do my best to make them feel comfortable and come through on my end of the deal so as to not make the company look bad for future students.
None	MBA	I was delegated to the majority of the time so did not have opportunity for initiative.

^a These final items are included to provide examples of situations where interns felt constrained or unable to engage in innovation efforts.

TABLE 7: Summary Statistics and Correlations^a

<i>Variable</i>	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Process Innovation Efforts	4.49	2.97													
2. Core Strategy Innov. Efforts	2.72	2.62	.44												
3. Outward Strat. Innov. Efforts	2.13	2.44	.29	.30											
4. Centralization	3.20	0.98	.05	-.06	.03										
5. Cross-unit Integration	3.79	0.59	-.02	.02	-.01	-.07									
6. Boundary Spanning	4.17	0.88	-.05	-.05	.06	-.01	.14								
7. Nonstandard Emp. (count)	10.14	46.76	.05	-.09	-.03	-.06	.10	-.03							
8. Temporary Unit (0/1)	1.03	0.17	-.09	-.08	.02	-.04	.15	.01	.03						
9. Geographic Dispersion	2.25	1.34	.00	-.06	-.05	-.01	.04	.17	.13	-.01					
10. Remote Employees (%)	14.98	26.52	.03	-.08	.07	.04	.03	.10	.12	.10	.32				
11. Decision Involvement	3.82	0.92	.00	-.06	-.08	-.14	.26	.24	.01	.01	.06	-.03			
12. Ego Network Size	10.42	6.75	.08	.07	.07	-.04	.08	-.02	.05	.05	.05	-.04	.12		
13. Ego Net. Functional Diversity	5.25	4.74	.14	.16	.01	.01	.07	-.03	.02	.01	.05	-.08	.07	.73	
14. Proactive Personality	5.12	0.81	.22	.14	.13	.06	-.02	-.04	-.04	.04	-.02	-.05	-.06	.06	.06
15. Experience Breadth	7.13	3.80	.16	.13	.23	.04	-.06	.02	.04	-.01	-.09	-.07	-.03	-.05	-.02
16. Organization Age	16.22	6.12	-.06	.00	-.17	-.12	.05	-.01	.07	-.03	-.04	-.03	-.02	.21	.09
17. Organization Size (log)	6.76	2.66	-.16	-.06	-.18	-.16	.15	-.01	.06	-.06	.12	.00	.07	.34	.16
18. Unit Size (employees)	36.05	59.67	.04	-.02	-.07	.05	.06	.03	.42	-.02	.31	.14	.06	.05	.02
19. Functional Diversity (unit)	1.00	0.68	.11	.01	.15	.04	.11	.08	.15	.03	.14	.09	.01	-.22	-.10
20. Tenure Average (unit)	4.29	2.50	-.05	-.07	-.12	-.03	-.07	-.14	.04	-.13	.04	-.01	-.16	-.08	-.03
21. Tenure Diversity (unit)	1.12	0.47	-.02	-.03	-.08	.04	.14	.03	.19	-.03	.17	.11	.01	.07	.06
22. Support for Innovation	4.23	0.66	.05	-.02	.05	-.04	.36	.16	.03	.08	.03	.07	.37	-.05	-.11
23. Function: Sales/Marketing	0.24	0.43	.00	.01	.33	.06	.17	.08	-.06	.01	-.02	.06	.03	.03	.03
24. Function: General Mgmt.	0.11	0.32	.17	.24	.03	-.07	.01	-.01	.06	-.01	-.05	.00	.01	.17	.20
25. Intern Hierarchical Level	1.54	0.87	.18	.27	.28	-.06	.12	-.06	.04	.06	-.07	.08	-.03	.16	.12
26. Internship Length (weeks)	11.88	6.10	.13	.06	.07	-.10	.03	-.14	-.02	-.01	-.04	-.08	-.02	.02	.04
27. Weekly Salary	505.16	484.13	-.11	-.02	-.11	-.11	.08	.04	.05	.04	.11	.06	.11	.29	.11
28. Unpaid Internship (0/1)	0.20	0.40	.04	.01	.06	.02	-.04	.09	.00	-.05	-.06	.03	-.02	-.26	-.16
29. Hours Worked per Week	36.70	14.32	.03	.05	-.03	-.09	.05	.03	.10	.13	.08	.08	-.01	.32	.21
30. Autonomy	4.07	0.67	.17	.21	.10	-.05	.00	-.03	.09	-.08	.03	.04	-.01	.13	.13
31. Task Interdependence	5.58	1.43	.18	.10	.23	-.06	.11	.08	.02	.09	.04	.10	.05	.28	.16
32. Supervisory Feedback	4.02	0.87	.11	.04	.16	.06	.09	.07	-.07	.04	.01	.05	.05	.15	.15
33. Psychological Safety	4.31	0.65	.19	.09	.16	.05	.08	.00	-.04	.06	.00	.02	.04	.16	.18
34. Job Satisfaction	3.97	0.71	.08	-.01	.07	.06	.05	.02	-.01	.08	.03	.04	.03	.26	.15
35. Prior Contacts in Firm	0.30	0.46	-.05	.01	.10	-.02	-.05	.01	-.11	-.01	-.09	-.16	.07	.12	.05
36. Prior Work in Firm	0.08	0.28	.11	.04	.01	-.03	.06	-.09	.13	.06	-.01	.00	-.01	.03	.07
37. Tie Closeness	2.35	0.50	-.03	.07	.02	.10	.10	.04	-.01	.04	-.05	-.02	.02	-.06	-.03
38. Gender (1=female)	0.46	0.50	-.04	-.06	.04	.00	.06	.07	-.08	.00	-.08	.06	.05	.07	.06
39. MBA (0/1)	0.17	0.38	-.06	.06	-.01	-.10	.06	.07	.08	.00	.05	.02	.09	.20	.09
40. Organization Exp. (count)	5.05	3.07	.06	.06	.08	.02	-.03	.09	.12	-.05	-.04	-.01	.02	.10	.09
41. Years Work Experience	1.45	2.12	.05	.11	.04	-.10	.03	-.02	.11	-.01	-.01	.00	.07	.20	.14
42. Non-US (0/1)	0.11	0.32	.00	-.05	-.06	.00	.02	.01	.08	-.01	.11	-.05	.09	.06	.06
43. Conscientiousness	5.75	0.96	.02	-.08	-.04	.09	.06	-.02	-.04	.03	-.02	-.03	.03	-.05	-.03
44. Openness	5.41	0.89	.07	.09	.08	.04	.04	-.06	-.01	.00	-.03	.05	.06	.10	.05
45. Risk Aversion	2.46	1.14	-.13	-.08	-.01	-.02	.06	.02	-.01	.01	.02	-.01	-.02	-.13	-.09
46. Sample Selection Inst.	0.73	0.07	-.10	-.01	-.07	-.06	.05	.03	.03	.04	.11	.04	.08	.06	-.05

^a Pearson correlation coefficients based on observations in final models (n= 355). Correlations > |.10| are significant at p < .05.

TABLE 7: Summary Statistics and Correlations

(continued from previous page)

<i>Variable</i>	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
15. Experience Breadth	.24															
16. Organization Age	-.01	-.07														
17. Organization Size (log)	.01	-.10	.65													
18. Unit Size (employees)	-.01	.06	.17	.28												
19. Functional Diversity (unit)	-.03	.04	-.21	-.29	.30											
20. Tenure Average (unit)	-.02	.06	.32	.15	.14	.08										
21. Tenure Diversity (unit)	.01	-.12	.19	.27	.49	.28	.07									
22. Support for Innovation	.00	.01	-.12	-.11	.04	.17	-.12	.03								
23. Function: Sales/Marketing	-.04	-.01	-.10	-.08	-.08	.04	-.13	.01	.11							
24. Function: General Mgmt.	.02	.00	.09	.06	.14	.08	-.12	.10	.06	-.20						
25. Intern Hierarchical Level	.08	.20	.07	.07	.04	.04	-.06	-.01	.02	.12	.26					
26. Internship Length (weeks)	.05	.09	-.13	-.08	-.08	.01	.06	-.08	-.08	.05	-.03	-.01				
27. Weekly Salary	-.01	-.02	.31	.49	.14	-.30	-.04	.08	-.12	-.08	.11	.30	-.07			
28. Unpaid Internship (0/1)	-.07	-.01	-.24	-.30	-.09	.22	-.02	-.09	.11	.07	-.09	-.16	-.12	-.53		
29. Hours Worked per Week	.11	.02	.25	.31	.09	-.20	-.09	.06	-.10	-.12	.15	.23	-.20	.52	-.38	
30. Autonomy	.11	.10	-.01	.04	.03	-.12	.02	-.06	-.02	.02	.08	.22	.09	.19	-.10	.14
31. Task Interdependence	.18	.10	.07	.12	.03	-.04	-.15	-.02	.03	.14	.06	.23	-.01	.19	-.15	.31
32. Supervisory Feedback	.16	.03	-.10	-.15	-.13	-.01	-.06	-.10	.09	.19	-.10	.06	.00	-.03	.00	.03
33. Psychological Safety	.21	.10	-.12	-.16	.00	-.03	-.05	-.06	.09	.15	.00	.13	.13	.03	-.05	.01
34. Job Satisfaction	.25	.10	.00	-.01	-.02	-.04	-.02	-.05	-.01	-.01	-.03	.16	.04	.14	-.20	.15
35. Prior Contacts in Firm	.03	.00	.01	-.02	-.16	-.06	-.06	-.14	-.01	.03	-.02	.03	-.06	-.03	-.06	.00
36. Prior Work in Firm	-.04	.07	.04	.02	.06	.04	.11	-.05	-.04	-.08	.12	.14	-.04	-.07	-.10	.07
37. Tie Closeness	.20	.15	-.09	-.12	-.04	-.01	-.01	-.03	.02	-.01	-.04	.06	-.04	-.05	-.08	.11
38. Gender (1=female)	-.17	-.16	.04	-.03	-.04	.00	-.03	.04	.10	.18	.00	-.04	-.09	-.08	.07	-.11
39. MBA (0/1)	-.06	.02	.26	.34	.15	-.16	-.05	.03	-.06	.03	.21	.41	-.08	.79	-.23	.32
40. Organization Exp. (count)	.10	.26	.03	.02	.02	.03	-.04	-.04	.01	.03	.06	.25	.04	.21	-.07	.10
41. Years Work Experience	.03	.15	.18	.27	.14	-.11	-.04	-.01	-.08	.02	.21	.40	-.05	.60	-.24	.23
42. Non-US (0/1)	.02	.06	.09	.13	.16	-.02	-.02	.06	-.02	.03	.07	.06	-.09	.21	-.07	.15
43. Conscientiousness	.19	.03	-.09	-.04	.01	.03	.05	-.01	-.05	-.09	-.10	-.03	.09	-.07	.02	-.10
44. Openness	.35	.11	.00	-.01	.06	.02	.00	.02	.05	.06	-.08	-.01	.06	.01	.04	.03
45. Risk Aversion	-.29	-.08	.06	.04	.06	.00	.03	.05	-.05	-.07	.02	-.01	-.07	.03	-.04	.00
46. Sample Selection Inst.	.07	.09	.12	.27	.06	-.17	.02	.00	-.09	.07	-.12	.19	.08	.60	-.28	.23

<i>Variable</i>	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
31. Task Interdependence	.15															
32. Supervisory Feedback	.13	.30														
33. Work Experience (years)	.39	.39	.42													
34. Job Satisfaction	.14	.46	.49	.42												
35. Prior Contacts in Firm	-.09	.05	.06	-.07	.12											
36. Prior Work in Firm	.08	.02	.01	.06	.02	-.20										
37. Tie Closeness	-.04	.10	.18	.07	.23	.02	.03									
38. Gender (1=female)	-.01	-.03	.10	.14	.05	-.07	.01	-.10								
39. MBA (0/1)	.19	.16	-.08	.00	.03	-.06	-.09	-.11	-.05							
40. Organization Exp. (count)	.09	.03	-.08	.01	.03	-.02	.05	-.06	.02	.25						
41. Years Work Experience	.21	.17	-.08	-.02	.04	-.02	.03	-.14	-.13	.73	.37					
42. Non-US (0/1)	.01	.00	-.04	-.03	-.02	.00	-.01	-.03	-.02	.28	.03	.29				
43. Conscientiousness	.01	-.05	.05	.15	.09	.03	.03	.01	.12	-.10	.02	-.07	-.03			
44. Openness	.11	.08	.13	.17	.09	.00	-.02	.02	.05	-.03	.03	.00	-.02	.30		
45. Risk Aversion	-.02	-.06	-.15	-.05	-.05	-.12	.05	-.08	.00	.03	-.04	-.02	.02	-.04	-.24	
46. Sample Selection Inst.	.13	.11	-.05	-.06	.06	.02	-.12	-.01	-.51	.57	.12	.43	.15	-.11	.03	-.08

TABLE 8: Negative Binomial Regression Results for Process Innovation Efforts^a

		Model (DV=Process Innovation Efforts)						
Variable	Hyp.	(1) Controls	(2) Main Eff.	(3)	(4)	(5) Squared Terms	(6)	(7)
Intercept		1.350** (0.506)	1.081 (0.606)	0.366 (0.663)	1.787 (1.111)	0.971 (0.727)	1.042 (0.604)	0.927 (0.623)
Centralization	H1		0.034 (0.036)	0.555** (0.204)	0.034 (0.036)	0.033 (0.036)	0.036 (0.036)	0.031 (0.036)
Centralization ²	H1			-0.085** (0.033)				
Cross-unit Integration	H2		-0.014 (0.062)	-0.020 (0.061)	-0.410 (0.528)	-0.015 (0.062)	-0.017 (0.061)	-0.016 (0.062)
Cross-unit Integration ²	H2				0.054 (0.072)			
Boundary Spanning	H3		-0.031 (0.040)	-0.036 (0.039)	-0.026 (0.040)	0.036 (0.245)	-0.033 (0.040)	-0.025 (0.040)
Boundary Spanning ²	H3					-0.009 (0.033)		
Nonstandard Employees	H4		0.0003 (0.001)	0.0003 (0.001)	0.0003 (0.001)	0.0003 (0.001)	-0.002 (0.002)	0.0003 (0.001)
Nonstandard Employees ²	H4						0.000 (0.000)	
Temporary Work Unit	H5		-0.500* (0.220)	-0.465* (0.219)	-0.517* (0.221)	-0.498* (0.220)	-0.466* (0.220)	-0.504* (0.219)
Geographic Dispersion	H6		0.022 (0.027)	0.015 (0.027)	0.023 (0.027)	0.022 (0.027)	0.028 (0.027)	0.156 (0.134)
Geographic Dispersion ²	H6							-0.025 (0.024)
Decision Process Involvement	H7		0.045 (0.040)	0.035 (0.039)	0.044 (0.040)	0.045 (0.040)	0.046 (0.039)	0.045 (0.039)
Network Size	H8		-0.001 (0.008)	-0.001 (0.008)	-0.001 (0.008)	-0.001 (0.008)	-0.0004 (0.008)	-0.0002 (0.008)
Network Size ²	H8							
Network Functional Diversity	H9		0.013 (0.010)	0.012 (0.010)	0.013 (0.010)	0.013 (0.010)	0.012 (0.010)	0.013 (0.010)
Proactive Personality			0.135** (0.044)	0.132** (0.044)	0.137** (0.044)	0.135** (0.044)	0.136** (0.044)	0.136** (0.044)
Proactive Pers. × Dec. Process Inv.	H10							
Proactive Pers. × Cross-unit Integ.	H11							
Experience Breadth			0.009 (0.009)	0.008 (0.009)	0.008 (0.009)	0.009 (0.009)	0.009 (0.009)	0.008 (0.009)
Experience × Dec. Process Inv.	H12							
Experience × Cross-unit Integ.	H13							

(continued on following page)

TABLE 8

(continued from previous page)

Variable	Hyp.	Model (DV=Process Innovation Efforts)						
		(1) Controls	(2) Main Eff.	(3)	(4)	(5) Squared Terms	(6)	(7)
Organization Age		0.008 (0.007)	0.011 (0.007)	0.010 (0.007)	0.011 (0.007)	0.011 (0.007)	0.012 (0.007)	0.011 (0.007)
Organization Size (log)		-0.051** (0.018)	-0.057** (0.019)	-0.061** (0.019)	-0.057** (0.019)	-0.057** (0.019)	-0.06** (0.019)	-0.057** (0.019)
Unit Size (employees)		0.001 (0.001)	0.0004 (0.001)	0.0003 (0.001)	0.0004 (0.001)	0.0004 (0.001)	0.001 (0.001)	0.0004 (0.001)
Unit Functional Diversity		0.040 (0.058)	0.054 (0.058)	0.066 (0.057)	0.052 (0.058)	0.055 (0.058)	0.055 (0.057)	0.044 (0.058)
Function: Sales/Marketing		-0.053 (0.085)	-0.038 (0.084)	-0.058 (0.083)	-0.038 (0.084)	-0.037 (0.084)	-0.035 (0.083)	-0.042 (0.084)
Function: General Management		0.167 (0.113)	0.147 (0.111)	0.125 (0.110)	0.148 (0.111)	0.147 (0.111)	0.151 (0.111)	0.146 (0.111)
Intern Hierarchical Level		0.07 (0.043)	0.072 (0.042)	0.070 (0.042)	0.073 (0.042)	0.072 (0.042)	0.074 (0.042)	0.076 (0.042)
Autonomy		0.140* (0.055)	0.114* (0.054)	0.121* (0.053)	0.116* (0.054)	0.115* (0.054)	0.121* (0.054)	0.119* (0.054)
Task Interdependence		0.078** (0.029)	0.077** (0.028)	0.070* (0.028)	0.075** (0.028)	0.077** (0.028)	0.078** (0.028)	0.074** (0.028)
Supervisory Feedback		0.038 (0.047)	0.030 (0.046)	0.034 (0.045)	0.031 (0.046)	0.029 (0.046)	0.033 (0.046)	0.030 (0.046)
Job Satisfaction		-0.046 (0.060)	-0.085 (0.059)	-0.082 (0.059)	-0.087 (0.059)	-0.085 (0.059)	-0.096 (0.059)	-0.085 (0.059)
Internship Length (weeks)		0.013* (0.005)	0.012* (0.005)	0.012* (0.005)	0.012* (0.005)	0.012* (0.005)	0.012* (0.005)	0.012* (0.005)
Work Experience (years)		0.014 (0.019)	0.011 (0.019)	0.010 (0.019)	0.011 (0.019)	0.011 (0.019)	0.013 (0.019)	0.010 (0.019)
Risk Aversion		-0.073* (0.030)	-0.036 (0.031)	-0.034 (0.031)	-0.037 (0.031)	-0.037 (0.031)	-0.036 (0.031)	-0.034 (0.031)
Sample Selection Instrument		1.138* (0.549)	1.079* (0.542)	0.952 (0.540)	1.090* (0.542)	1.076* (0.542)	1.108* (0.540)	1.07* (0.541)
Log Likelihood ^b		887.30	898.44	901.83	898.72	898.48	899.42	898.96
Δ -2Log Likelihood ^c			22.28*	6.79**	0.57	0.08	1.97	1.04

^a n=355 in all models. ^b Model 1 χ^2 p = .27 ^c Mod. 2 cf. Mod. 1, all others cf. Mod. 2.
* p < .05; ** p < .01, *** p < .001 (Two-tailed tests. Standard errors in parentheses.)

(continued on following page)

TABLE 8

(continued from previous page)

Variable	Hyp.	Model (DV=Process Innovation Efforts)					
		(8) Sq. Term	(9)	(10)	(11) Interaction Terms	(12)	(13) Final
Intercept		1.020 (0.606)	0.232 (1.118)	0.855 (1.590)	0.410 (0.676)	-0.002 (0.728)	-0.985 (0.794)
Centralization	H1	0.035 (0.036)	0.032 (0.036)	0.034 (0.036)	0.038 (0.036)	0.032 (0.036)	0.565** (0.202)
Centralization ²	H1						-0.087** (0.032)
Cross-unit Integration	H2	-0.013 (0.062)	-0.015 (0.062)	0.046 (0.389)	-0.005 (0.061)	0.272* (0.124)	0.226 (0.128)
Cross-unit Integration ²	H2						
Boundary Spanning	H3	-0.032 (0.040)	-0.030 (0.040)	-0.031 (0.040)	-0.026 (0.040)	-0.024 (0.039)	-0.027 (0.039)
Boundary Spanning ²	H3						
Nonstandard Employees	H4	0.0003 (0.001)	0.0003 (0.001)	0.0003 (0.001)	0.0004 (0.001)	0.0002 (0.001)	0.0002 (0.001)
Nonstandard Employees ²	H4						
Temporary Work Unit	H5	-0.511* (0.219)	-0.507* (0.220)	-0.497* (0.220)	-0.535* (0.219)	-0.518* (0.218)	-0.502* (0.217)
Geographic Dispersion	H6	0.022 (0.027)	0.023 (0.027)	0.022 (0.027)	0.022 (0.027)	0.025 (0.027)	0.017 (0.026)
Geographic Dispersion ²	H6						
Decision Process Involvement	H7	0.045 (0.039)	0.266 (0.247)	0.045 (0.040)	0.210* (0.085)	0.047 (0.039)	0.142 (0.088)
Network Size	H8	0.020 (0.017)	-0.001 (0.008)	-0.001 (0.008)	-0.002 (0.008)	-0.001 (0.008)	-0.002 (0.008)
Network Size ²	H8	-0.001 (0.001)					
Network Functional Diversity	H9	0.012 (0.010)	0.012 (0.010)	0.013 (0.010)	0.013 (0.010)	0.014 (0.010)	0.013 (0.010)
Proactive Personality		0.139** (0.044)	0.300 (0.187)	0.179 (0.285)	0.134** (0.044)	0.128** (0.044)	0.126** (0.043)
Proactive Pers. × Dec. Process Inv.	H10		-0.042 (0.047)				
Proactive Pers. × Cross-unit Integ.	H11			-0.012 (0.075)			
Experience Breadth		0.008 (0.009)	0.009 (0.009)	0.008 (0.009)	0.095* (0.040)	0.151** (0.055)	0.183** (0.058)
Experience × Dec. Process Inv.	H12				-0.023* (0.010)		-0.014 (0.011)
Experience × Cross-unit Integ.	H13					-0.038** (0.015)	-0.032* (0.015)

(continued on following page)

TABLE 8

(continued from previous page)

Variable	Hyp.	Model (DV=Process Innovation Efforts)					
		(8) Sq. Term	(9)	(10)	(11)	(12)	(13) Final
Organization Age		0.010 (0.007)	0.011 (0.007)	0.011 (0.007)	0.010 (0.007)	0.009 (0.007)	0.009 (0.007)
Organization Size (log)		-0.060** (0.019)	-0.057** (0.019)	-0.057** (0.019)	-0.053** (0.019)	-0.056** (0.019)	-0.058** (0.019)
Unit Size (employees)		0.0004 (0.001)	0.0004 (0.001)	0.0004 (0.001)	0.0004 (0.001)	0.001 (0.001)	0.0003 (0.001)
Unit Functional Diversity		0.049 (0.058)	0.052 (0.058)	0.054 (0.058)	0.056 (0.057)	0.054 (0.057)	0.067 (0.057)
Function: Sales/Marketing		-0.046 (0.084)	-0.039 (0.084)	-0.038 (0.084)	-0.040 (0.083)	-0.018 (0.083)	-0.043 (0.083)
Function: General Management		0.132 (0.111)	0.144 (0.111)	0.146 (0.111)	0.159 (0.111)	0.137 (0.110)	0.125 (0.109)
Intern Hierarchical Level		0.074 (0.042)	0.072 (0.042)	0.073 (0.042)	0.075 (0.042)	0.079 (0.042)	0.077 (0.041)
Autonomy		0.114* (0.053)	0.112* (0.054)	0.115* (0.054)	0.099 (0.054)	0.112* (0.053)	0.110* (0.053)
Task Interdependence		0.073* (0.028)	0.077** (0.028)	0.076** (0.028)	0.077** (0.028)	0.076** (0.028)	0.070* (0.028)
Supervisory Feedback		0.033 (0.046)	0.030 (0.046)	0.031 (0.046)	0.037 (0.046)	0.035 (0.045)	0.043 (0.045)
Job Satisfaction		-0.097 (0.060)	-0.081 (0.059)	-0.086 (0.059)	-0.088 (0.059)	-0.091 (0.059)	-0.088 (0.058)
Internship Length (weeks)		0.012* (0.005)	0.012* (0.005)	0.012* (0.005)	0.012* (0.005)	0.011* (0.005)	0.011* (0.005)
Work Experience (years)		0.013 (0.019)	0.011 (0.019)	0.011 (0.019)	0.010 (0.019)	0.010 (0.019)	0.009 (0.018)
Risk Aversion		-0.035 (0.031)	-0.037 (0.031)	-0.036 (0.031)	-0.044 (0.031)	-0.042 (0.031)	-0.044 (0.030)
Sample Selection Instrument		1.053 (0.541)	1.074* (0.541)	1.077* (0.542)	0.988 (0.540)	0.992 (0.537)	0.820 (0.535)
Log Likelihood ^b		899.42	898.85	898.45	900.86	901.88	906.43
Δ -2Log Likelihood ^c		1.96	0.82	0.02	4.84*	6.88**	15.98**

^a n=355 in all models. ^b Model 1 χ^2 p = .27 ^c Mod. 2 cf. Mod. 1, all others cf. Mod. 2.
* p < .05; ** p < .01, *** p < .001 (Two-tailed tests. Standard errors in parentheses.)

TABLE 9: Negative Binomial Regression Results for Core Strategy Innovation Efforts^a

		Model (DV=Core Strategy Innovation Efforts)						
Variable	Hyp.	(1) Controls	(2) Main Eff.	(3)	(4)	(5) Squared Terms	(6)	(7)
Intercept		0.019 (0.766)	0.307 (0.915)	-0.270 (1.012)	1.618 (1.635)	0.011 (1.075)	0.307 (0.916)	0.391 (0.940)
Centralization	H1		-0.060 (0.052)	0.329 (0.296)	-0.059 (0.052)	-0.061 (0.052)	-0.060 (0.052)	-0.058 (0.052)
Centralization ²	H1			-0.064 (0.048)				
Cross-unit Integration	H2		0.086 (0.091)	0.084 (0.091)	-0.665 (0.780)	0.081 (0.091)	0.086 (0.091)	0.088 (0.091)
Cross-unit Integration ²	H2				0.102 (0.106)			
Boundary Spanning	H3		-0.040 (0.058)	-0.041 (0.058)	-0.031 (0.059)	0.142 (0.352)	-0.040 (0.058)	-0.043 (0.058)
Boundary Spanning ²	H3					-0.025 (0.048)		
Nonstandard Employees	H4		-0.005** (0.002)	-0.005** (0.002)	-0.005** (0.002)	-0.005** (0.002)	-0.004 (0.004)	-0.005** (0.002)
Nonstandard Employees ²	H4						-0.0000 (0.000)	
Temporary Work Unit	H5		-0.654* (0.332)	-0.628 (0.332)	-0.685* (0.335)	-0.645 (0.333)	-0.656* (0.334)	-0.652* (0.332)
Geographic Dispersion	H6		0.005 (0.039)	-0.003 (0.040)	0.005 (0.039)	0.006 (0.039)	0.004 (0.040)	-0.072 (0.198)
Geographic Dispersion ²	H6							0.014 (0.036)
Decision Process Involvement	H7		-0.050 (0.056)	-0.057 (0.056)	-0.049 (0.056)	-0.050 (0.056)	-0.050 (0.056)	-0.049 (0.056)
Network Size	H8		-0.015 (0.013)	-0.015 (0.013)	-0.015 (0.013)	-0.015 (0.013)	-0.015 (0.013)	-0.016 (0.013)
Network Size ²	H8							
Network Functional Diversity	H9		0.040* (0.016)	0.039* (0.016)	0.040* (0.016)	0.040* (0.016)	0.041* (0.016)	0.040* (0.016)
Proactive Personality			0.097 (0.065)	0.094 (0.065)	0.105 (0.065)	0.095 (0.065)	0.097 (0.065)	0.097 (0.065)
Proactive Pers. × Dec. Process Inv.	H10							
Proactive Pers. × Cross-unit Integ.	H11							
Experience Breadth			0.017 (0.014)	0.018 (0.014)	0.017 (0.014)	0.018 (0.014)	0.017 (0.014)	0.017 (0.014)
Experience × Dec. Process Inv.	H12							
Experience × Cross-unit Integ.	H13							

(continued on following page)

TABLE 9

(continued from previous page)

Variable	Hyp.	Model (DV= Core Strategy Innovation Effort)						
		(1) Controls	(2) Main Eff.	(3)	(4)	(5) Squared Terms	(6)	(7)
Organization Age		0.009 (0.011)	0.013 (0.011)	0.013 (0.011)	0.014 (0.011)	0.012 (0.011)	0.013 (0.011)	0.013 (0.011)
Organization Size (log)		-0.039 (0.027)	-0.053 (0.029)	-0.056 (0.029)	-0.053 (0.029)	-0.052 (0.029)	-0.052 (0.029)	-0.052 (0.029)
Unit Size (employees)		-0.001 (0.001)	0.0003 (0.001)	0.0002 (0.001)	0.0002 (0.001)	0.0002 (0.001)	0.0002 (0.001)	0.0002 (0.001)
Unit Functional Diversity		0.031 (0.083)	0.035 (0.082)	0.043 (0.082)	0.032 (0.082)	0.037 (0.082)	0.035 (0.082)	0.040 (0.083)
Function: Sales/Marketing		0.027 (0.125)	0.046 (0.123)	0.021 (0.125)	0.045 (0.123)	0.049 (0.124)	0.045 (0.124)	0.047 (0.124)
Function: General Management		0.432** (0.161)	0.383* (0.157)	0.370* (0.157)	0.382* (0.157)	0.387* (0.157)	0.382* (0.157)	0.382* (0.157)
Intern Hierarchical Level		0.164** (0.062)	0.141* (0.061)	0.141* (0.061)	0.145* (0.061)	0.141* (0.061)	0.141* (0.061)	0.139* (0.062)
Autonomy		0.257** (0.082)	0.246** (0.080)	0.251** (0.080)	0.246** (0.080)	0.249** (0.080)	0.246** (0.080)	0.244** (0.080)
Task Interdependence		0.054 (0.042)	0.057 (0.041)	0.053 (0.041)	0.054 (0.042)	0.058 (0.041)	0.057 (0.041)	0.059 (0.042)
Supervisory Feedback		0.026 (0.068)	0.008 (0.067)	0.012 (0.066)	0.009 (0.067)	0.005 (0.067)	0.008 (0.067)	0.008 (0.067)
Job Satisfaction		-0.138 (0.086)	-0.153 (0.086)	-0.153 (0.086)	-0.156 (0.086)	-0.151 (0.086)	-0.153 (0.086)	-0.154 (0.086)
Internship Length (weeks)		0.009 (0.008)	0.004 (0.008)	0.005 (0.008)	0.005 (0.008)	0.004 (0.008)	0.004 (0.008)	0.004 (0.008)
Work Experience (years)		0.007 (0.029)	0.002 (0.028)	0.0002 (0.028)	0.002 (0.028)	0.002 (0.028)	0.002 (0.028)	0.002 (0.028)
Risk Aversion		-0.057 (0.044)	-0.041 (0.046)	-0.038 (0.046)	-0.042 (0.046)	-0.044 (0.046)	-0.040 (0.046)	-0.043 (0.046)
Sample Selection Instrument		0.218 (0.817)	0.012 (0.802)	0.127 (0.808)	0.049 (0.802)	0.001 (0.801)	0.008 (0.803)	0.020 (0.802)
Log Likelihood ^b		126.70	139.83	140.71	140.30	139.96	139.83	139.90
Δ -2Log Likelihood ^c			26.25**	1.78	0.94	0.28	0.01	0.16

^a n=355 in all models. ^b Model 1 χ^2 p = .12 ^c Mod. 2 cf. Mod. 1, all others cf. Mod. 2.
 * p < .05; ** p < .01, *** p < .001 (Two-tailed tests. Standard errors in parentheses.)

(continued on following page)

TABLE 9

(continued from previous page)

Variable	Hyp.	Model (DV= Core Strategy Innovation Effort)					
		(8) Sq. Term	(9)	(10) Interaction Terms	(11) Interaction Terms	(12)	(13) Final
Intercept		0.264 (0.915)	4.638** (1.531)	-1.676 (2.260)	0.701 (1.023)	-0.057 (1.107)	4.638** (1.531)
Centralization	H1	-0.060 (0.052)	-0.051 (0.051)	-0.062 (0.052)	-0.062 (0.052)	-0.059 (0.052)	-0.051 (0.051)
Centralization ²	H1						
Cross-unit Integration	H2	0.085 (0.091)	0.111 (0.090)	0.609 (0.553)	0.081 (0.091)	0.179 (0.185)	0.111 (0.090)
Cross-unit Integration ²	H2						
Boundary Spanning	H3	-0.041 (0.058)	-0.045 (0.057)	-0.045 (0.058)	-0.043 (0.058)	-0.037 (0.058)	-0.045 (0.057)
Boundary Spanning ²	H3						
Nonstandard Employees	H4	-0.005** (0.002)	-0.005** (0.002)	-0.005** (0.002)	-0.005** (0.002)	-0.005** (0.002)	-0.005** (0.002)
Nonstandard Employees ²	H4						
Temporary Work Unit	H5	-0.661* (0.332)	-0.615 (0.328)	-0.620 (0.333)	-0.634 (0.333)	-0.660* (0.332)	-0.615 (0.328)
Geographic Dispersion	H6	0.005 (0.039)	-0.005 (0.039)	0.007 (0.039)	0.004 (0.039)	0.007 (0.039)	-0.005 (0.039)
Geographic Dispersion ²	H6						
Decision Process Involvement	H7	-0.049 (0.056)	-1.218*** (0.340)	-0.054 (0.056)	-0.143 (0.122)	-0.049 (0.056)	-1.218*** (0.340)
Network Size	H8	0.001 (0.025)	-0.013 (0.012)	-0.016 (0.013)	-0.015 (0.013)	-0.016 (0.013)	-0.013 (0.012)
Network Size ²	H8	-0.001 (0.001)					
Network Functional Diversity	H9	0.040* (0.016)	0.040** (0.016)	0.040* (0.016)	0.040* (0.016)	0.0410* (0.016)	0.040** (0.016)
Proactive Personality		0.098 (0.065)	-0.774** (0.257)	0.487 (0.412)	0.099 (0.065)	0.095 (0.065)	-0.774** (0.257)
Proactive Pers. × Dec. Process Inv.	H10		0.227*** (0.065)				0.227*** (0.065)
Proactive Pers. × Cross-unit Integ.	H11			-0.104 (0.108)			
Experience Breadth		0.017 (0.014)	0.018 (0.014)	0.017 (0.014)	-0.033 (0.060)	0.064 (0.081)	0.018 (0.014)
Experience × Dec. Process Inv.	H12				0.013 (0.015)		
Experience × Cross-unit Integ.	H13					-0.012 (0.021)	

(continued on following page)

TABLE 9

(continued from previous page)

Variable	Hyp.	Model (DV= Core Strategy Innovation Effort)					
		(8) Sq. Term	(9)	(10)	(11)	(12)	(13) Final
Organization Age		0.012 (0.011)	0.012 (0.011)	0.012 (0.011)	0.013 (0.011)	0.013 (0.011)	0.012 (0.011)
Organization Size (log)		-0.055 (0.029)	-0.052 (0.028)	-0.050 (0.029)	-0.055 (0.029)	-0.052 (0.029)	-0.052 (0.028)
Unit Size (employees)		0.0002 (0.001)	0.0002 (0.001)	0.0002 (0.001)	0.0002 (0.001)	0.0002 (0.001)	0.0002 (0.001)
Unit Functional Diversity		0.030 (0.082)	0.051 (0.081)	0.032 (0.082)	0.032 (0.082)	0.035 (0.082)	0.051 (0.081)
Function: Sales/Marketing		0.041 (0.123)	0.051 (0.121)	0.048 (0.123)	0.045 (0.123)	0.053 (0.124)	0.051 (0.121)
Function: General Management		0.375* (0.157)	0.414** (0.154)	0.376* (0.157)	0.379* (0.157)	0.378* (0.157)	0.414** (0.154)
Intern Hierarchical Level		0.142* (0.061)	0.145* (0.060)	0.148* (0.062)	0.141* (0.061)	0.144* (0.062)	0.145* (0.060)
Autonomy		0.245** (0.080)	0.257** (0.079)	0.250** (0.080)	0.255** (0.081)	0.245** (0.080)	0.257** (0.079)
Task Interdependence		0.054 (0.042)	0.059 (0.041)	0.053 (0.042)	0.058 (0.041)	0.056 (0.042)	0.059 (0.041)
Supervisory Feedback		0.009 (0.067)	0.008 (0.065)	0.018 (0.067)	0.004 (0.067)	0.010 (0.067)	0.008 (0.065)
Job Satisfaction		-0.160 (0.086)	-0.189* (0.085)	-0.155 (0.086)	-0.155 (0.086)	-0.155 (0.086)	-0.189* (0.085)
Internship Length (weeks)		0.004 (0.008)	0.007 (0.008)	0.004 (0.008)	0.004 (0.008)	0.004 (0.008)	0.007 (0.008)
Work Experience (years)		0.002 (0.028)	0.004 (0.028)	0.002 (0.028)	0.003 (0.028)	0.002 (0.028)	0.004 (0.028)
Risk Aversion		-0.041 (0.046)	-0.038 (0.045)	-0.045 (0.046)	-0.036 (0.046)	-0.043 (0.046)	-0.038 (0.045)
Sample Selection Instrument		0.028 (0.801)	0.040 (0.787)	0.001 (0.801)	0.088 (0.805)	0.016 (0.802)	0.040 (0.787)
Log Likelihood ^b		140.11	145.83	140.29	140.19	140.00	145.83
Δ -2Log Likelihood ^c		0.56	12.00***	0.92	0.74	0.34	12.00***

^a n=355 in all models. ^b Model 1 χ^2 p = .12 ^c Mod. 2 *cf.* Mod. 1, all others *cf.* Mod. 2.

* p < .05; ** p < .01, *** p < .001 (Two-tailed tests. Standard errors in parentheses.)

TABLE 10: Negative Binomial Regression Results for Outward Strategy Innovation Efforts^a

Variable	Hyp.	Model (DV=Outward Strategy Innovation Efforts)						
		(1) Controls	(2) Main Eff.	(3)	(4)	(5) Squared Terms	(6)	(7)
Intercept		0.105 (0.930)	-0.027 (1.064)	-0.023 (1.155)	-1.810 (2.073)	-1.688 (1.347)	-0.063 (1.064)	-0.072 (1.097)
Centralization	H1		-0.007 (0.062)	-0.010 (0.344)	-0.006 (0.062)	-0.012 (0.062)	-0.003 (0.062)	-0.007 (0.062)
Centralization ²	H1			0.0004 (0.056)				
Cross-unit Integration	H2		-0.194 (0.110)	-0.194 (0.110)	0.808 (1.007)	-0.203 (0.109)	-0.202 (0.110)	-0.195 (0.110)
Cross-unit Integration ²	H2				-0.136 (0.136)			
Boundary Spanning	H3		0.074 (0.072)	0.074 (0.072)	0.066 (0.072)	1.033* (0.483)	0.071 (0.072)	0.076 (0.073)
Boundary Spanning ²	H3					-0.128* (0.064)		
Nonstandard Employees	H4		0.0002 (0.002)	0.0002 (0.002)	0.0002 (0.002)	0.0002 (0.002)	-0.003 (0.004)	0.0002 (0.002)
Nonstandard Employees ²	H4						0.0000 (0.000)	
Temporary Work Unit	H5		0.102 (0.327)	0.102 (0.328)	0.131 (0.328)	0.128 (0.326)	0.157 (0.331)	0.101 (0.327)
Geographic Dispersion	H6		-0.002 (0.048)	-0.002 (0.048)	-0.005 (0.047)	-0.001 (0.047)	0.006 (0.048)	0.037 (0.237)
Geographic Dispersion ²	H6							-0.007 (0.043)
Decision Process Involvement	H7		-0.088 (0.068)	-0.088 (0.068)	-0.086 (0.068)	-0.088 (0.068)	-0.085 (0.068)	-0.087 (0.068)
Network Size	H8		0.035** (0.014)	0.035** (0.014)	0.035** (0.014)	0.036** (0.014)	0.037** (0.014)	0.036** (0.014)
Network Size ²	H8							
Network Functional Diversity	H9		-0.041* (0.018)	-0.041* (0.018)	-0.041* (0.018)	-0.044* (0.018)	-0.042* (0.018)	-0.041* (0.018)
Proactive Personality			0.154 (0.082)	0.154 (0.082)	0.146 (0.082)	0.152 (0.081)	0.152 (0.082)	0.154 (0.082)
Proactive Pers. × Dec. Process Inv.	H10							
Proactive Pers. × Cross-unit Integ.	H11							
Experience Breadth			0.053** (0.016)	0.053** (0.016)	0.053** (0.016)	0.053** (0.016)	0.053** (0.016)	0.052** (0.016)
Experience × Dec. Process Inv.	H12							
Experience × Cross-unit Integ.	H13							

(continued on following page)

TABLE 10

(continued from previous page)

Variable	Hyp.	Model (DV= Outward Strategy Innovation Effort)						
		(1) Controls	(2) Main Eff.	(3)	(4)	(5) Squared Terms	(6)	(7)
Organization Age		-0.014 (0.012)	-0.022 (0.012)	-0.022 (0.012)	-0.022 (0.012)	-0.023 (0.012)	-0.02 (0.012)	-0.022 (0.012)
Organization Size (log)		-0.025 (0.032)	-0.007 (0.033)	-0.007 (0.033)	-0.008 (0.033)	-0.006 (0.033)	-0.011 (0.034)	-0.007 (0.033)
Unit Size (employees)		-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)
Unit Functional Diversity		0.214* (0.101)	0.265** (0.099)	0.265** (0.099)	0.268** (0.099)	0.266** (0.099)	0.264** (0.099)	0.262** (0.101)
Function: Sales/Marketing		0.585*** (0.140)	0.679*** (0.137)	0.679*** (0.138)	0.676*** (0.137)	0.696*** (0.136)	0.686*** (0.137)	0.676*** (0.137)
Function: General Management		0.212 (0.203)	0.245 (0.202)	0.245 (0.202)	0.244 (0.202)	0.270 (0.202)	0.254 (0.202)	0.245 (0.202)
Intern Hierarchical Level		0.205** (0.073)	0.176* (0.072)	0.176* (0.072)	0.174* (0.072)	0.182* (0.072)	0.177* (0.072)	0.178* (0.073)
Autonomy		0.107 (0.100)	0.076 (0.095)	0.076 (0.096)	0.068 (0.095)	0.083 (0.095)	0.084 (0.096)	0.076 (0.096)
Task Interdependence		0.152** (0.050)	0.121* (0.049)	0.121* (0.050)	0.126* (0.049)	0.124* (0.049)	0.120* (0.049)	0.120* (0.049)
Supervisory Feedback		0.134 (0.086)	0.155 (0.084)	0.155 (0.084)	0.152 (0.084)	0.146 (0.084)	0.159 (0.084)	0.154 (0.084)
Job Satisfaction		-0.136 (0.104)	-0.205* (0.103)	-0.205* (0.103)	-0.202* (0.102)	-0.199 (0.102)	-0.215* (0.103)	-0.205* (0.103)
Internship Length (weeks)		0.009 (0.010)	0.009 (0.009)	0.009 (0.009)	0.009 (0.009)	0.007 (0.009)	0.009 (0.009)	0.009 (0.009)
Work Experience (years)		0.020 (0.035)	0.015 (0.034)	0.015 (0.034)	0.015 (0.034)	0.012 (0.034)	0.018 (0.034)	0.015 (0.034)
Risk Aversion		0.031 (0.050)	0.086 (0.051)	0.086 (0.051)	0.086 (0.051)	0.072 (0.051)	0.085 (0.051)	0.087 (0.051)
Sample Selection Instrument		1.696 (1.016)	1.974* (0.978)	1.974* (0.982)	1.923* (0.976)	1.936* (0.973)	2.007* (0.978)	1.971* (0.977)
Log Likelihood ^b		-8.39	7.05	7.05	7.55	9.12	7.54	7.06
Δ -2Log Likelihood ^c			30.88**	0.00	1.00	4.15*	1.00	0.03

^a n=355 in all models. ^b Model 1 χ^2 p < .05 ^c Mod. 2 cf. Mod. 1, all others cf. Mod. 2.
* p < .05; ** p < .01, *** p < .001 (Two-tailed tests. Standard errors in parentheses.)

(continued on following page)

TABLE 10

(continued from previous page)

Variable	Hyp.	Model (DV= Outward Strategy Innovation Effort)					
		(8) Sq. Term	(9)	(10)	(11) Interaction Terms	(12)	(13) Final
Intercept		0.022 (1.071)	-3.089 (2.014)	-2.397 (2.914)	-0.636 (1.189)	-0.067 (1.291)	-1.688 (1.347)
Centralization	H1	-0.007 (0.062)	-0.006 (0.062)	-0.004 (0.062)	-0.004 (0.062)	-0.007 (0.062)	-0.012 (0.062)
Centralization ²	H1						
Cross-unit Integration	H2	-0.194 (0.110)	-0.197 (0.109)	0.425 (0.717)	-0.184 (0.110)	-0.183 (0.218)	-0.203 (0.109)
Cross-unit Integration ²	H2						
Boundary Spanning	H3	0.075 (0.072)	0.075 (0.071)	0.074 (0.072)	0.078 (0.072)	0.075 (0.072)	1.033* (0.483)
Boundary Spanning ²	H3						-0.128* (0.064)
Nonstandard Employees	H4	0.0002 (0.002)	0.0001 (0.002)	0.0001 (0.002)	0.0001 (0.002)	0.0001 (0.002)	0.0002 (0.002)
Nonstandard Employees ²	H4						
Temporary Work Unit	H5	0.107 (0.328)	0.083 (0.327)	0.137 (0.329)	0.059 (0.329)	0.101 (0.328)	0.128 (0.326)
Geographic Dispersion	H6	-0.002 (0.048)	0.010 (0.048)	-0.0001 (0.048)	-0.002 (0.047)	-0.002 (0.048)	-0.001 (0.047)
Geographic Dispersion ²	H6						
Decision Process Involvement	H7	-0.089 (0.068)	0.708 (0.450)	-0.088 (0.068)	0.060 (0.147)	-0.088 (0.068)	-0.088 (0.068)
Network Size	H8	0.023 (0.030)	0.035** (0.014)	0.035** (0.014)	0.035* (0.014)	0.035** (0.014)	0.036** (0.014)
Network Size ²	H8	0.0004 (0.001)					
Network Functional Diversity	H9	-0.041* (0.018)	-0.041* (0.018)	-0.041* (0.018)	-0.041* (0.018)	-0.041* (0.018)	-0.044* (0.018)
Proactive Personality		0.152 (0.082)	0.743* (0.340)	0.610 (0.529)	0.151 (0.081)	0.154 (0.082)	0.152 (0.081)
Proactive Pers. × Dec. Process Inv.	H10		-0.153 (0.086)				
Proactive Pers. × Cross-unit Integ.	H11			-0.121 (0.139)			
Experience Breadth		0.053** (0.016)	0.052** (0.016)	0.052** (0.016)	0.130 (0.071)	0.058 (0.096)	0.053** (0.016)
Experience × Dec. Process Inv.	H12				-0.021 (0.018)		
Experience × Cross-unit Integ.	H13					-0.001 (0.025)	

(continued on following page)

TABLE 10

(continued from previous page)

Variable	Hyp.	Model (DV= Outward Strategy Innovation Effort)					
		(8) Sq. Term	(9)	(10) Interaction Terms	(11)	(12) Final	(13)
Organization Age		-0.022 (0.012)	-0.021 (0.012)	-0.023 (0.012)	-0.022 (0.012)	-0.022 (0.012)	-0.023 (0.012)
Organization Size (log)		-0.005 (0.034)	-0.011 (0.033)	-0.004 (0.033)	-0.003 (0.033)	-0.007 (0.033)	-0.006 (0.033)
Unit Size (employees)		-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)
Unit Functional Diversity		0.270** (0.100)	0.247* (0.099)	0.261** (0.099)	0.267** (0.099)	0.265** (0.099)	0.266** (0.099)
Function: Sales/Marketing		0.686*** (0.138)	0.664*** (0.136)	0.676*** (0.136)	0.682*** (0.136)	0.679*** (0.137)	0.696*** (0.136)
Function: General Management		0.253 (0.203)	0.239 (0.201)	0.236 (0.202)	0.250 (0.201)	0.244 (0.202)	0.270 (0.202)
Intern Hierarchical Level		0.175* (0.072)	0.182* (0.072)	0.186* (0.073)	0.178* (0.072)	0.177* (0.072)	0.182* (0.072)
Autonomy		0.075 (0.096)	0.067 (0.095)	0.081 (0.096)	0.063 (0.096)	0.075 (0.096)	0.083 (0.095)
Task Interdependence		0.123* (0.049)	0.123* (0.049)	0.115* (0.049)	0.121* (0.049)	0.120* (0.049)	0.124* (0.049)
Supervisory Feedback		0.154 (0.084)	0.158 (0.084)	0.162 (0.084)	0.158 (0.084)	0.155 (0.084)	0.146 (0.084)
Job Satisfaction		-0.199 (0.104)	-0.192 (0.103)	-0.208* (0.102)	-0.203* (0.102)	-0.205* (0.103)	-0.199 (0.102)
Internship Length (weeks)		0.009 (0.010)	0.007 (0.009)	0.009 (0.009)	0.008 (0.009)	0.009 (0.010)	0.007 (0.009)
Work Experience (years)		0.015 (0.034)	0.014 (0.034)	0.015 (0.034)	0.013 (0.034)	0.015 (0.034)	0.012 (0.034)
Risk Aversion		0.086 (0.051)	0.084 (0.050)	0.085 (0.051)	0.079 (0.051)	0.086 (0.051)	0.072 (0.051)
Sample Selection Instrument		2.006* (0.981)	1.973* (0.974)	1.985* (0.977)	1.863 (0.980)	1.968* (0.983)	1.936* (0.973)
Log Likelihood ^b		7.15	8.65	7.43	7.68	7.05	9.12
Δ -2Log Likelihood ^c		0.21	3.21	0.76	1.28	0.00	4.15*

^a n=355 in all models. ^b Model 1 χ^2 p < .05 ^c Mod. 2 cf. Mod. 1, all others cf. Mod. 2.
* p < .05; ** p < .01, *** p < .001 (Two-tailed tests. Standard errors in parentheses.)

TABLE 11: Summary of Results

<i>Hyp.</i>	<i>Independent Variable</i>	<i>Prediction</i>	Results by Outcome Variable		
			<i>Process Innovation Efforts</i> (Table 8 Mod. 13)	<i>Core Strategy Innovation Efforts</i> (Table 9 Mod. 13)	<i>Outward Strategy Innovation Efforts</i> (Table 10 Mod. 13)
H1	Centralization	–	∩**		
H2	Cross-unit Integration	∩			
H3	Boundary Spanning	+			∩*
H4	Nonstandard Employees	∩		–**	
H5	Temporary Work Unit	+/-	–*		
H6	Geographic Dispersion	∩			
H7	Decision Process Involvement	+		–***	
H8	Network Size	∩			+**
H9	Network Functional Diversity	+		+**	–*
-	Proactive Personality		+**	–**	+*
H10	Proactive Pers. × Dec. Process Involv.	see fig. 4		see fig. 10***	
H11	Proactive Personality × Cross-unit Integ.	see fig. 5			
-	Experience Breadth		+**		+**
H12	Experience Breadth × Dec. Proc. Involv.	see fig. 6			
H13	Experience Breadth × Cross-unit Integ.	see fig. 7	see fig. 11*		
	Significant controls		Org. size -** Intern level +* Autonomy +* Task interdep. +* Internship length +*	Func. gen. mgmt. +** Intern level +* Autonomy +** Job satisfaction -*	Unit func. div. +** Func. sales/mkt +*** Intern level +* Task interdep. +*

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

FIGURE 8: Curvilinear Effect of Centralization on Process Innovation Efforts

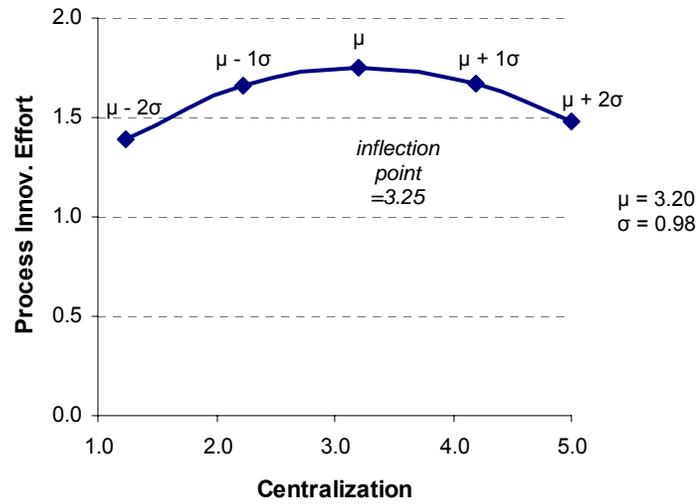


FIGURE 9: Curvilinear Effect of Boundary Spanning on Outward Strategy Innovation Efforts

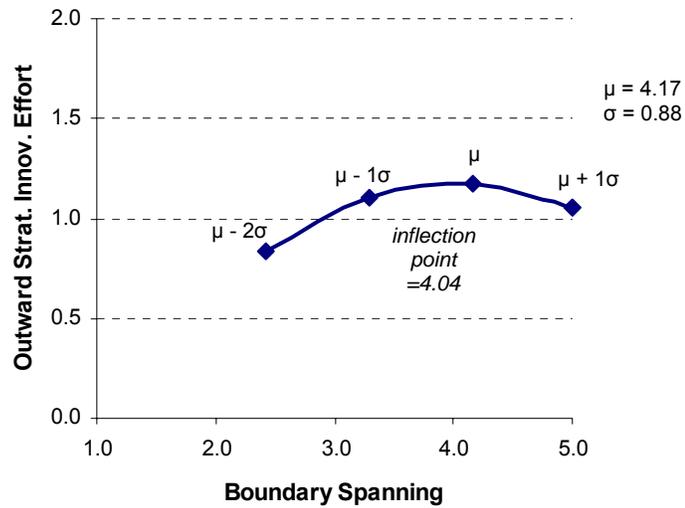


FIGURE 10: Interaction Effects of Proactive Personality × Decision Process Involvement on Core Strategy Innovation Efforts

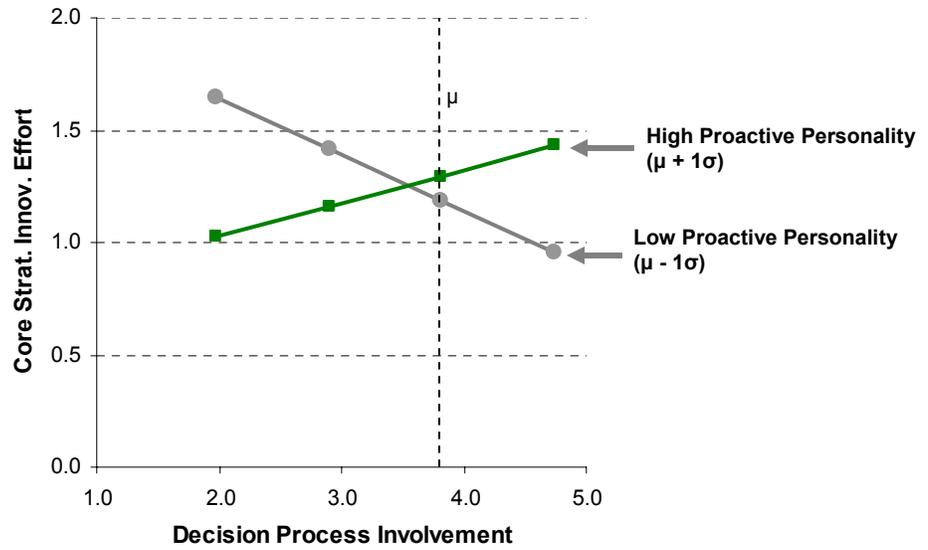
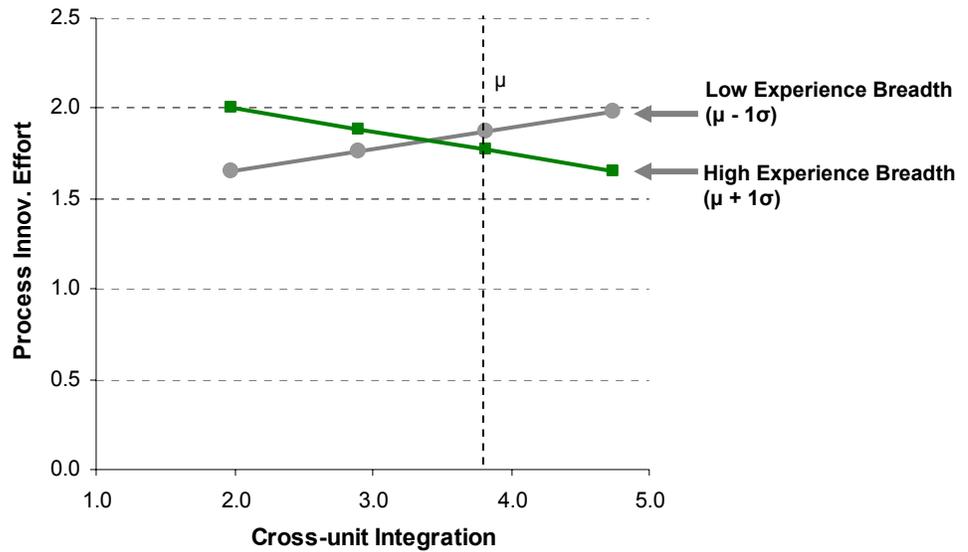


FIGURE 11: Interaction Effects of Experience Breadth × Cross-unit Integration on Process Innovation Efforts



APPENDIX. SURVEY INSTRUMENT ITEMS

DV: Individual Innovation Efforts (intern exit survey)

In some cases interns may be able to influence the way things are done in an organization. In other cases individuals may have limited opportunities to introduce changes. Think about your own attempts to initiate change and innovation in the organization during your internship. For each of the following, indicate how often you demonstrated the behavior described, if at all. Once again, be as objective as possible.

	Never	Once	Two or three times	Four or more times
I tried to change how my job was executed in order to be more effective	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried to bring about improved procedures in the work unit	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried to institute new work methods that would be more effective for the company	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
I tried to correct a faulty procedure or practice	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried to introduce new systems or technologies to improve efficiency	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
I tried to introduce new or improved product or service ideas	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
I proposed changes to existing products or services	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
I tried to implement changes in pricing, promotion, sales, or other marketing activities	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
I proposed expansion of operations or sales into new geographies or market segments	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried to develop or improve relationships with other organizations (i.e., suppliers, clients, partners)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Very briefly, identify a specific example of how you demonstrated initiative during your internship in one of the areas listed above:

I developed a strategy to introduce one of our products into China.

IV: Centralization (supervisor survey)

In organizations some decisions are made at lower-levels, by department or unit managers, while other decisions are made at higher levels. Using the scale provided, indicate how decisions regarding the following items are typically made in your organization.

	Decided independently by the unit	Decided by the unit after consultation with higher-level management	Decided by unit, subject to approval by higher-level management	Decided by higher-level management after consultation with the unit	Decided entirely by higher-level management
The overall direction of your department/unit's efforts	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Which projects your department/unit pursues	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your department/unit's budget	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The performance standards for your department/unit	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

IV: Cross-Unit Integration (supervisor survey)

Please indicate the extent to which you agree or disagree with following items, as they apply to your company or organization.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There is a great deal of departmental or cross-unit interaction on most decisions	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People from your work unit frequently meet with or communicate with people in other units in your organization	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interdepartmental committees, working groups, or task forces are set up to facilitate inter-unit collaboration	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are people specifically assigned to act as liaisons to coordinate efforts across departments	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Each work unit makes decisions more or less on its own, without regard to other departments	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This company tightly coordinates activities across units	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

IV: Boundary Spanning (supervisor survey)

Please indicate the extent to which you agree or disagree with following items, as they apply to your department or workgroup specifically.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Employees in your unit frequently meet with individuals from other companies or organizations (e.g., suppliers, partners, customers)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees in your unit frequently communicate directly with individuals in other organizations by e-mail, phone, or other means	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees in your unit rely heavily on information gathered from other companies or organizations in doing their jobs	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employees in your unit must work closely with employees in other companies or organizations in order to coordinate work activities	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

IV: Employee Count (for nonstandard employee count) (supervisor survey)

For the following questions, think about your department or workgroup as a whole, across all physical locations. (If your work unit is organized around specific projects, for example development teams or project teams, then answer the following questions as they would apply to the project team or group.)

How many full-time employees are in your workgroup (including contract and temporary employees)? people

How many full-time employees in your workgroup are contract workers, if any? (for example, subcontractors or outside consultants) people

How many full-time employees in your workgroup are temporary workers, if any? (that is, hired for a limited duration, either directly or through an agency)? people

IV: Temporary Unit (supervisor survey)

Is this workgroup a temporary unit within the organization that will be dissolved or reorganized upon completion of a specific project or task (for example a consulting or audit team)?

- No, it is permanent
- Yes, it is temporary

IV: Geographic Dispersion (supervisor survey)

Which of the following best describes your workgroup in terms of where employees are located?

- Everyone works in the **same work area**
- Everyone works in the **same building, but multiple work areas**
- Employees work in **multiple buildings, but in the same city**
- Employees work in **multiple cities**
- Employees work in **multiple countries**

IV: Remote Employees (supervisor survey)

What percentage of the workgroup's employees work remotely the majority of the time (i.e., either from home, a satellite office, or in the field)?

%

IV: Decision Process Involvement (supervisor survey)

Organizations also differ in the extent to which nonmanagers (e.g., staff or line employees) are involved in making decisions. Indicate the extent to which nonmanagers in your department/workgroup are involved or uninvolved in the following decision-making steps.

	Nonmanagers not involved at all			Nonmanagers very involved		
Diagnosing situations to understand problems or opportunities	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Generating ideas and alternatives	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evaluating and comparing alternatives	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Making a final selection among alternatives	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

IV: Ego Network Name Generation (intern exit survey)

1. List people who were valuable sources of information, including individuals to whom you reported and others you interacted with regularly as a part of your job. Consider those you interacted with face-to-face, as well as indirectly (by phone or e-mail) both inside and outside your organization.

2. List people whom you considered to be friends (people you might see on breaks or outside of work). Do not repeat any names from your first list. (You will be able to indicate friendship ties with those individuals later.)

Add Names

IV: Ego Network Tie Characteristics (intern exit survey, questions for each name entered)

Please describe each individual briefly by answering the following questions.

Individual	Affiliation	Work Location	Job Function (e.g., marketing)	Reporting Relationship	Position	Communication frequency	Friendship strength
mike	<input type="radio"/> Same work group <input type="radio"/> Same company, different group <input checked="" type="radio"/> Different company	<input type="radio"/> Same work area <input type="radio"/> Same building or campus, different work area <input checked="" type="radio"/> Different city, state, or country	<input type="radio"/> Same/similar function <input checked="" type="radio"/> Different function	<input checked="" type="radio"/> I reported to this person <u>directly</u> <input type="radio"/> I reported to this person <u>indirectly</u> <input type="radio"/> No reporting relationship	<input checked="" type="radio"/> Exec./Sr. Manager <input type="radio"/> Mid-level manager <input type="radio"/> Low-level manager <input type="radio"/> Non-manager/staff	<input type="radio"/> More than once a day <input type="radio"/> Once a day <input type="radio"/> Several times a week <input checked="" type="radio"/> Once a week <input type="radio"/> Less than once a week	<input type="radio"/> Not friends <input type="radio"/> Weak friends <input checked="" type="radio"/> Close friends <input type="radio"/> Very Close friends

IV. Proactive Personality (intern initial survey)

Indicate the extent to which you agree or disagree with each statement below, as it applies to you.

	Strongly Disagree		Neutral		Strongly Agree	
Wherever I have been, I have been a powerful force for constructive change	<input checked="" type="radio"/>	<input type="radio"/>				
I enjoy facing and overcoming obstacles to my ideas	<input checked="" type="radio"/>	<input type="radio"/>				
If I see something I don't like, I fix it	<input checked="" type="radio"/>	<input type="radio"/>				
No matter what the odds, if I believe in something I will make it happen	<input checked="" type="radio"/>	<input type="radio"/>				
I love being a champion for my ideas, even against others' opposition	<input checked="" type="radio"/>	<input type="radio"/>				
I excel at identifying opportunities	<input checked="" type="radio"/>	<input type="radio"/>				
I am always looking for better ways to do things	<input checked="" type="radio"/>	<input type="radio"/>				
If I believe in an idea, no obstacle will prevent me from making it happen	<input checked="" type="radio"/>	<input type="radio"/>				
I love to challenge the status quo	<input checked="" type="radio"/>	<input type="radio"/>				
When I have a problem, I tackle it head-on	<input checked="" type="radio"/>	<input type="radio"/>				
I am great at turning problems into opportunities	<input checked="" type="radio"/>	<input type="radio"/>				
I can spot a good opportunity long before others can	<input checked="" type="radio"/>	<input type="radio"/>				

IV. Intern Experience Breadth (intern initial survey)

Indicate the amount of experience you have, if any, in each of the following functional areas:

	No Experience	Limited Experience	Moderate Experience	Extensive Experience
Accounting	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Finance	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human Resources	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information Systems/IT	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marketing/Sales	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Operations/Production	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
R&D/Engineering	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Strategic Planning/Consulting	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

REFERENCES

- Abbey, A., & Dickson, J. W. 1983. R&D work climate and innovation in semiconductors. *Academy of Management Journal*, 26(2): 362-368.
- Ackoff, R. L. 1981. *Creating the corporate future: Plan or be planned for*. New York: Wiley.
- Ahuja, M. K., & Galvin, J. E. 2003. Socialization in virtual groups. *Journal of Management*, 29(2): 161-185.
- Aiken, M., & Hage, J. 1971. The organic organization and innovation. *Sociology*, 5(1): 63-82.
- Almeida, P., & Kogut, B. 1999. Localization of knowledge and the mobility of engineers in regional networks. *Management Science*, 45(7): 905-917.
- Amabile, T. M. 1979. Effects of external evaluation on artistic creativity. *Journal of Personality and Social Psychology*, 37(2): 221-233.
- Amabile, T. M. 1988. A model of creativity and innovation in organizations. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, 10: 123-167. GREENWICH, CT 06836-1678: JAI PRESS INC.
- Amabile, T. M., & Conti, R. 1999. Changes in the work environment for creativity during downsizing. *Academy of Management Journal*, 42(6): 630-640.
- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. 1996. Assessing the work environment for creativity. *Academy of Management Journal*, 39(5): 1154-1184.
- Ancona, D. G., & Caldwell, D. F. 1992. Demography and design: Predictors of new product team performance. *Organization Science*, 3(3): 321-341.
- Anderson, N. R., & West, M. A. 1998. Measuring climate for work group innovation: Development and validation of the team climate inventory. *Journal of Organizational Behavior*, 19(3): 235-258.
- Andrews, F. M., & Farris, G. F. 1972. Time pressure and performance of scientists and engineers: A five-year panel study. *Organizational Behavior & Human Performance*, 8(2): 185-200.
- Andrews, J., & Smith, D. C. 1996. In search of the marketing imagination: Factors affecting the creativity of marketing programs for mature products. *Journal of Marketing Research*, 33(2): 174-187.
- Argote, L., McEvily, B., & Reagans, R. 2003. Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Science*, 49(4): 571-582.

- Argyris, C. 1994. Good communication that blocks learning. *Harvard Business Review*, 72(4): 77-85.
- Arthur, J. B., & Aiman-Smith, L. 2001. Gainsharing and organizational learning: An analysis of employee suggestions over time. *Academy of Management Journal*, 44(4): 737-754.
- Asch, S. E. 1955. Opinions and social pressure. *Scientific American*, 193: 31-35.
- Ashford, S. J., Rothbard, N. P., Piderit, S. K., & Dutton, J. E. 1998. Out on a climb: The role of context and impression management in selling gender-equity issues. *Administrative Science Quarterly*, 43(1): 23-57.
- Baer, M., & Frese, M. 2003. Innovation is not enough: Climates for initiative and psychological safety, process innovations, and firm performance. *Journal of Organizational Behavior*, 24(1): 45-68.
- Barki, H., & Pinsonneault, A. 2005. A model of organizational integration, implementation effort, and performance. *Organization Science*, 16(2): 165-179.
- Barnard, C. I. 1938. *The functions of the executive*. Cambridge, Mass.: Harvard University Press.
- Barney, J. B. 1986. Organizational culture: Can it be a source of sustained competitive advantage. *Academy of Management Review*, 11(3): 656-665.
- Barney, J. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17(1): 99-120.
- Baron, R. M. , & Kenny, D. A. 1986. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6): 1173-1182.
- Barringer, B. R., & Bluedorn, A. C. 1999. The relationship between corporate entrepreneurship and strategic management. *Strategic Management Journal*, 20(5): 421-444.
- Barron, D. N. , West, E., & Hannan, M. T. 1994. A time to grow and a time to die: growth and mortality of credit unions in New York City, 1914-1990. *American Journal of Sociology*, 100(2): 381-421.
- Barry, B., & Crant, J. M. 2000. Dyadic communication relationships in organizations: An attribution/expectancy approach. *Organization Science*, 11(6): 648-664.
- Bartlett, C. A., & Ghoshal, S. 1993. Beyond the M-form: Toward a managerial theory of the firm. *Strategic Management Journal*, 14(SI): 23-46.
- Bartlett, C. A., & Ghoshal, S. 1996. Release the entrepreneurial hostages from your corporate hierarchy. *Strategy & Leadership*, 24(4): 36-42.

- Bateman, T. S., & Crant, J. M. 1993. The proactive component of organizational behavior: A measure and correlates. *Journal of Organizational Behavior*, 14(2): 103-118.
- Becherer, R. C., & Maurer, J. G. 1999. The proactive personality disposition and entrepreneurial behavior among small company presidents. *Journal of Small Business Management*, 37(1): 28-36.
- Bharadwaj, S., & Menon, A. 2000. Making innovation happen in organizations: Individual creativity mechanisms, organizational creativity mechanisms or both? *Journal of Product Innovation Management*, 17(6): 424-434.
- Bies, R. J., & Shapiro, D. L. 1988. Voice and justification: Their influence on procedural fairness judgments. *Academy of Management Journal*, 31(3): 676-685.
- Bird, B. J. 1989. *Entrepreneurial behavior*. Glenview, Ill.: Scott, Foresman.
- Birkinshaw, J., Nobel, R., & Ridderstrale, J. 2002. Knowledge as a contingency variable: Do the characteristics of knowledge predict organization structure? *Organization Science*, 13(3): 274-289.
- Borgatti, S. P., & Cross, R. 2003. A relational view of information seeking and learning in social networks. *Management Science*, 49(4): 432-445.
- Brass, D. J., & Burkhardt, M. E. 1992. Centrality and power in organizations. In N. Nohria & R. G. Eccles (Eds.), *Networks and organizations: Structure, form and action*: 191-214. Boston: Harvard Business School Press.
- Brayfield, A. H., & Rothe, H. F. 1951. An index of job satisfaction. *Journal of Applied Psychology*, 35:307-311.
- Brophy, D. R. 1998. Understanding, measuring, and enhancing collective creative problem-solving efforts. *Creativity Research Journal*, 11(3): 199-229.
- Brown, S. L., & Eisenhardt, K. M. 1997. The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly*, 42(1): 1-34.
- Buchanan II, B. 1974. Building organizational commitment: The socialization of managers in work organizations. *Administrative Science Quarterly*, 19(4): 533-546.
- Burgelman, R. A. 1991. Intraorganizational ecology of strategy making and organizational adaptation: theory and field research. *Organization Science*, 2(3): 239-262.
- Burgelman, R. A. 1983a. A process model of internal corporate venturing in the diversified major firm. *Administrative Science Quarterly*, 28(2): 223-244.
- Burgelman, R. A. 1983b. Corporate entrepreneurship and strategic management: Insights from a process study. *Management Science*, 29(12): 1349-1364.

- Burt, R. S. 1992. *Structural holes: The social structure of competition*. Cambridge, MA: Harvard University Press.
- Burt, R. S. 1984. Network items and the general social survey. *Social Networks*, 6(4): 293-339.
- Burt, R. S. 2004. Structural holes and good ideas. *American Journal of Sociology*, 110(2): 349-399.
- Cable, D. M., & Judge, T. A. 1994. Pay preferences and job search decisions: A person-organization fit perspective. *Personnel Psychology*, 47(2): 317-348.
- Callahan, J. S., Kiker, D. S., & Cross, T. 2003. Does method matter? A meta-analysis of the effects of training method on older learner training performance. *Journal of Management*, 29(5): 663-680.
- Cameron, K. S., Dutton, J. E., & Quinn, R. E. 2003. *Positive organizational scholarship*. San Francisco, CA: Berrett-Koehler.
- Cappelli, P., & Sherer, P. D. 1991. The missing role of context in OB: The need for a meso-level approach. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, 13: 55-110. Greenwich, CT: JAI Press.
- Carletta, J., Garrod, S., & Fraser-Krauss, H. 1998. Placement of authority and communication patterns in workplace groups - the consequences for innovation. *Small Group Research*, 29(5): 531-559.
- Carroll, G. R., & Teo, A. C. 1996. On the social networks of managers. *Academy of Management Journal*, 39(2): 421-440.
- Charles, D. 1981. The multiple socialization of organization members. *Academy of Management Review*, 6(2): 309-318.
- Chattopadhyay, P. 1999. Beyond direct and symmetrical effects: The influence of demographic dissimilarity on organizational citizenship behavior. *Academy of Management Journal*, 42(3): 273-287.
- Chesbrough, H. W., & Teece, D. J. 2002. Organizing for innovation: When is virtual virtuous? *Harvard Business Review*, 80(8): 127-+.
- Clark, K. B., & Fujimoto, T. 1991. *Product development performance: Strategy, organization, and management in the world auto industry*. Boston, Mass.: Harvard Business School Press.
- Cohen, W. M., & Levinthal, D. A. 1990. Absorptive-capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1): 128-152.
- Coopey, J., Keegan, O., & Emler, N. 1998. Managers' innovations and the structuration of organizations. *Journal of Management Studies*, 35(3): 263-284.

- Cramton, C. D. 2001. The mutual knowledge problem and its consequences for dispersed collaboration. *Organization Science*, 12(3): 346-371.
- Crant, J. M. 1995. The proactive personality scale and objective job performance among real estate agents. *Journal of Applied Psychology*, 80(4): 532-537.
- Crant, J. M. 1996a. Doing more harm than good: When is impression management likely to evoke a negative response? *Journal of Applied Social Psychology*, 26(16): 1454-1471-.
- Crant, J. M. 1996b. The proactive personality scale as a predictor of entrepreneurial intentions. *Journal of Small Business Management*, 34(3): 42-49.
- Crant, J. M. 2000. Proactive behavior in organizations. *Journal of Management*, 26(3): 435-462.
- Crown, D. F., & Rosse, J. G. 1995. Yours, mine, and ours - facilitating group productivity through the integration of individual and group goals. *Organizational Behavior and Human Decision Processes*, 64(2): 138-150.
- Cyert, R. M. , & March, J. G. 1963. *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Daft, R. L., & Lengel, R. H. 1986. Organizational information requirements, media richness and structural design. *Management Science*, 32(5): 554-571.
- Damanpour, F. 1987. The adoption of technological, administrative, and ancillary innovations: Impact of organizational-factors. *Journal of Management*, 13(4): 675-688.
- Damanpour, F. 1992. Organizational size and innovation. *Organization Studies*, 13(3): 375-402.
- Damanpour, F. 1996a. Bureaucracy and innovation revisited: Effects of contingency factors, industrial sectors, and innovation characteristics. *Journal of High Technology Management Research*, 7(2): 150-174.
- Damanpour, F. 1996b. Organizational complexity and innovation: Developing and testing multiple contingency models. *Management Science*, 42(5): 693-716.
- Damanpour, F., & Gopalakrishnan, S. 1998. Theories of organizational structure and innovation: The role of environmental change. *Journal of Engineering & Technology Management*, 15(1): 1-24.
- Davis-Blake, A., Broschak, J. P., & George, E. 2003. Happy together? How using nonstandard workers affects exit, voice, and loyalty among standard employees. *Academy of Management Journal*, 46(4): 475-485.
- Day, D. L. 1994. Raising radicals: Different processes for championing innovative corporate ventures. *Organization Science*, 5(2): 148-172.

- Decanio, S. J., Dibble, C., & Amir-Atefi, K. 2000. The importance of organizational structure for the adoption of innovations. *Management Science*, 46(10): 1285-1299.
- Deckop, J. R., Mangel, R., & Cirka, C. C. 1999. Getting more than you pay for: Organizational citizenship behavior and pay-for-performance plans. *Academy of Management Journal*, 42(4): 420-428.
- Desanctis, G., & Monge, P. 1999. Introduction to the special issue: Communication processes for virtual organizations. *Organization Science*, 10(6): 693-703.
- Dess, G. G., & Beard, D. W. 1984. Dimensions of organizational task environments. *Administrative Science Quarterly*, 29(1): 52-73.
- DiMaggio, P. J. , & Powell, W. W. 1983. The iron cage revisited: institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48: 147-160.
- Dougherty, D. 2001. Reimagining the differentiation and integration of work for sustained product innovation. *Organization Science*, 12(5): 612-631.
- Dougherty, D., & Hardy, C. 1996. Sustained product innovation in large, mature organizations: Overcoming innovation-to-organization problems. *Academy of Management Journal*, 39(5): 1120-1153.
- Drazin, R., Glynn, M. A., & Kazanjian, R. K. 1999. Multilevel theorizing about creativity in organizations: A sensemaking perspective. *Academy of Management Review*, 24(2): 286-307.
- Dutton, J. E. 1992. The making of organizational opportunities: An interpretive pathway to organizational-change. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, 15: 195-226. Greenwich, CT: JAI Press.
- Dutton, J. E., & Ashford, S. J. 1993. Selling issues to top management. *Academy of Management Review*, 18(3): 397-428.
- Dutton, J. E., & Duncan, R. B. 1987. The influence of the strategic-planning process on strategic change. *Strategic Management Journal*, 8(2): 103-116.
- Dutton, J. E., Ashford, S. J., Oneill, R. M., Hayes, E., & Wierba, E. E. 1997. Reading the wind: How middle managers assess the context for selling issues to top managers. *Strategic Management Journal*, 18(5): 407-423.
- Edmondson, A. 1999. Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, 44(2): 350-383.
- Eisenhardt, K. M., & Bourgeois, L. J. 1988. Politics of strategic decision-making in high-velocity environments: Toward a midrange theory. *Academy of Management Journal*, 31(4): 737-770.

- Ettlie, J. E. 1983. Organizational policy and innovation among suppliers to the food-processing sector. *Academy of Management Journal*, 26(1): 27-44.
- Ettlie, J. E., & Reza, E. M. 1992. Organizational integration and process innovation. *Academy of Management Journal*, 35(4): 795-827.
- Falcione, R. L., & Wilson, C. E. 1988. Socialization processes in organizations. In G. M. Goldhaber & G. A. Barnett (Eds.), *Handbook of organizational communication*: 151-169. Norwood, NJ: Ablex.
- Feldman, D. C. 1976. Contingency theory of socialization. *Administrative Science Quarterly*, 21(3): 433-452.
- Ferris, G. R., Treadway, D. C., Kolodinsky, R. W., Hochwarter, W. A., Kacmar, C. J., Douglas, C., & Frink, D. D. 2005. Development and validation of the political skill inventory. *Journal of Management*, 31(1): 126-152.
- Fidler, L. A., & Johnson, J. D. 1984. Communication and innovation implementation. *Academy of Management Review*, 9(4): 704-711.
- Fiol, C. M. 1994. Consensus, diversity, and learning in organizations. *Organization Science*, 5(3): 403-420.
- Fiol, C. M., & O'Connor, E. J. 2005. Identification in face-to-face, hybrid, and pure virtual teams: Untangling the contradictions. *Organization Science*, 16(1): 19-32.
- Folger, R., & Konovsky, M. A. 1989. Effects of procedural and distributive justice on reactions to pay raise decisions. *Academy of Management Journal*, 32(1): 115-130.
- Ford, C. M. 1996. Theory of individual creative action in multiple social domains. *Academy of Management Review*, 21(4): 1112-1142.
- Foss, N. J. 2001. Leadership, beliefs and coordination: An explorative discussion. *Industrial & Corporate Change*, 10(2): 357-388.
- Fredrickson, J. W. 1984. The comprehensiveness of strategic decision-processes: Extension, observations, future-directions. *Academy of Management Journal*, 27(3): 445-466.
- Fredrickson, J. W. 1986. The strategic decision-process and organizational-structure. *Academy of Management Review*, 11(2): 280-297.
- Fredrickson, J. W., & Mitchell, T. R. 1984. Strategic decision-processes: Comprehensiveness and performance in an industry with an unstable environment. *Academy of Management Journal*, 27(2): 399-423.
- Frese, M. 1982. Occupational socialization and psychological development: An underemphasized research perspective in industrial psychology. *Journal of Occupational Psychology*, 55(3): 209-224.

- Frese, M., & Fay, D. 1997. The concept of personal initiative: Operationalization, reliability and validity in two German samples. *Journal of Occupational & Organizational Psychology*, 70(2): 139-161.
- Frese, M., & Fay, D. 2001. Personal initiative: An active performance concept for work in the 21st century. In B. M. Staw & R. I. Sutton (Eds.), *Research in organizational behavior*, 23: 133-187. Amsterdam: JAI-Elsevier.
- Frese, M., Kring, W., Soose, A., & Zempel, J. 1996. Personal initiative at work: Differences between East and West Germany. *Academy of Management Journal*, 39(1): 37-63.
- Galbraith, J. R. 1982. Designing the innovating organization. *Organizational Dynamics*, 10(3): 4-24.
- George, J. M. , & Brief, A. P. 1992. Feeling good-doing good: a conceptual analysis of the mood at work-organizational spontaneity relationship. *Psychological Bulletin*, 112(2): 310-329.
- George, J. M., & Jones, G. R. 1997. Organizational spontaneity in context. *Human Performance*, 10(2): 153-170.
- Ghoshal, S., & Bartlett, C. A. 1994. Linking organizational context and managerial action: The dimensions of quality of management. *Strategic Management Journal*, 15(SI): 91-112.
- Gilson, L. L., & Shalley, C. E. 2004. A little creativity goes a long way: An examination of teams' engagement in creative processes. *Journal of Management*, 30(4): 453-470.
- Gist, M. E., & Mitchell, T. R. 1992. Self-efficacy: A theoretical-analysis of its determinants and malleability. *Academy of Management Review*, 17(2): 183-211.
- Gnam, J., & Neuhaus, K. 2005. Leading from the factory floor. *Harvard Business Review*, 83(11): 22-.
- Gogatz, A., & Mondejar, R. 2005. *Business creativity: Breaking the invisible barriers*. Houndmills, Basingstoke, Hampshire :: Palgrave Macmillan.
- Grabowski, M., & Roberts, K. H. 1999. Risk mitigation in virtual organizations. *Organization Science*, 10(6): 704-721.
- Graebner, M. E. 2004. Momentum and serendipity: How acquired leaders create value in the integration of technology firms. *Strategic Management Journal*, 25(8-9): 751-777.
- Granovetter, M. 1973. The strength of weak ties. *American Journal of Sociology*, 78(6): 1360-1380.
- Griffith, T. L., & Neale, M. A. 2001. Information processing in traditional, hybrid, and virtual teams: From nascent knowledge to transactive memory. In B. M. Staw & R. I. Sutton (Eds.), *Research in organizational behavior*, 23: 379-421. Amsterdam: Elsevier JAI.

- Gulati, R., Lawrence, P. R., & Puranam, P. 2005. Adaptation in vertical relationships: Beyond incentive conflict. *Strategic Management Journal*, 26(5): 415-440.
- Haas, M. R., & Hansen, M. T. 2005. When using knowledge can hurt performance: The value of organizational capabilities in a management consulting company. *Strategic Management Journal*, 26(1): 1-24.
- Hackman, J. R. 1976. Group influences on individuals. In M. Dunnette (Ed.), *Handbook of industrial and organizational psychology*: 1455-1525. Chicago: Rand McNally.
- Hackman, J. R. 1980. *Work redesign*. Reading, Mass.: Addison-Wesley.
- Hackman, J. R. 1990. *Groups that work (and those that don't): Creating conditions for effective teamwork*. San Francisco: Jossey-Bass.
- Hackman, J. R., & Oldham, G. R. 1976. Motivation through design of work - test of a theory. *Organizational Behavior and Human Performance*, 16(2): 250-279.
- Hambrick, D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2): 193-206.
- Hambrick, D. C., Geletkanycz, M. A., & Fredrickson, J. W. 1993. Top executive commitment to the status-quo: Some tests of its determinants. *Strategic Management Journal*, 14(6): 401-418.
- Hamel, G. 2000. *Leading the revolution*. Boston, Mass.: Harvard Business School Press.
- Hansen, M. T. 1999. The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44(1): 82-111.
- Hargadon, A., & Sutton, R. I. 1997. Technology brokering and innovation in a product development firm. *Administrative Science Quarterly*, 42(4): 716-749.
- Haveman, H. A. 1992. Between a rock and a hard place: Organizational-change and performance under conditions of fundamental environmental transformation. *Administrative Science Quarterly*, 37(1): 48-75.
- Heath, C., Larrick, R. P. , & Klayman, J. 1998. Cognitive repairs: how organizational practices can compensate for individual shortcomings. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, 20: 1-37. Greenwich, CT: JAI Press.
- Heckman, J. J. 1979. Sample selection bias as a specification error. *Econometrica*, 47(1): 153-161.
- Henderson, A. D. 1999. Firm strategy and age dependence: A contingent view of the liabilities of newness, adolescence, and obsolescence. *Administrative Science Quarterly*, 44(2): 281-314.

- Hinds, P. J., & Bailey, D. E. 2003. Out of sight, out of sync: Understanding conflict in distributed teams. *Organization Science*, 14(6): 615-632.
- Hinds, P. J., & Mortensen, M. 2005. Understanding conflict in geographically distributed teams: The moderating effects of shared identity, shared context, and spontaneous communication. *Organization Science*, 16(3): 290-307.
- Hinds, P., & Kiesler, S. 1995. Communication across boundaries: Work, structure, and use of communication technologies in a large organization. *Organization Science*, 6(4): 373-393.
- Hirschman, A. O. 1970. *Exit, voice, and loyalty*. Cambridge, MA: Harvard University Press.
- Hisrich, R. D. 1990. Entrepreneurship/Intrapreneurship. *American Psychologist*, 45(2): 209-222.
- Hogg, M. A., & Terry, D. J. 2000. Social identity and self-categorization processes in organizational contexts. *Academy of Management Review*, 25(1): 121-140.
- Horibe, F. 2001. *Creating the innovation culture: Leveraging visionaries, dissenters and other useful troublemakers in your organization*. Toronto ;: J. Wiley & Sons.
- Howell, J. M. 2005. The right stuff: Identifying and developing effective champions of innovation. *Academy of Management Executive*, 19(2): 108-119.
- Howell, J. M., & Higgins, C. A. 1990. Champions of technological innovation. *Administrative Science Quarterly*, 35(2): 317-341.
- Howell, J. M., & Shea, C. M. 2001. Individual differences, environmental scanning, innovation framing, and champion behavior: Key predictors of project performance. *Journal of Product Innovation Management*, 18(1): 15-27.
- Howell, J. M., Shea, C. M., & Higgins, C. A. 2005. Champions of product innovations: Defining, developing, and validating a measure of champion behavior. *Journal of Business Venturing*, 20(5): 641-661.
- Huber, G. P. 1990. A theory of the effects of advanced information technologies on organizational design, intelligence, and decision-making. *Academy of Management Review*, 15(1): 47-71.
- Huber, G. P. 1991. Organizational learning: The contributing processes and the literatures. *Organization Science*, 2(1): 88-115.
- Ibarra, H. 1992. Homophily and differential returns: Sex-differences in network structure and access in an advertising firm. *Administrative Science Quarterly*, 37(3): 422-447.
- Ibarra, H. 1993. Network centrality, power, and innovation involvement: Determinants of technical and administrative roles. *Academy of Management Journal*, 36(3): 471-501.

- Ibarra, H. 1995. Race, opportunity, and diversity of social circles in managerial networks. *Academy of Management Journal*, 38(3): 673-703.
- Inkpen, A. C., & Tsang, E. W. 2005. Social capital, networks, and knowledge transfer. *Academy of Management Review*, 30(1): 146-165.
- Inkson, J. H., Pugh, D. S., & Hickson, D. J. 1970. Organization context and structure: An abbreviated replication. *Administrative Science Quarterly*, 15(3): 318-329.
- Jablin, F. M., & Sussman, L. 1983. Organizational group communication: A review of the literature and model of the process. In H. H. Greenbaum, R. L. Falcione & S. A. Hellweg (Eds.), *Organizational communication: Abstracts. Analysis. And overview*, 8: 11-50. Newbury Park, CA: Sage.
- James, L. R. 1982. Aggregation bias in estimates of perceptual agreement. *Journal of Applied Psychology*, 67(2): 219-229.
- Jarvenpaa, S. L., & Leidner, D. E. 1999. Communication and trust in global virtual teams. *Organization Science*, 10(6): 791-815.
- Johnson, J. D. 2004. The emergence, maintenance, and dissolution of structural hole brokerage within consortia. *Communication Theory*, 14(3): 212-236.
- Joyce, W. F., McGee, V. E., & Slocum, J. W. 1997. Designing lateral organizations: An analysis of the benefits, costs, and enablers of nonhierarchical organizational forms. *Decision Sciences*, 28(1): 1-25.
- Kalleberg, A. L. 1996. *Organizations in America: Analyzing their structures and human resource practices*. Thousand Oaks, Calif.: Sage Publications.
- Kanter, R. M. 1988. When a 1000 flowers bloom: Structural, collective, and social conditions for innovation in organization. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, 10: 169-211. Greenwich, CT: JAI Press.
- Kanter, R. M. 1982. The middle manager as innovator. *Harvard Business Review*, 60(4): 95-105.
- Kanter, R. M. 1983. *The change masters: Innovations for productivity in the American corporation*. New York: Simon and Schuster.
- Kanter, R. M. 2004. The middle manager as innovator. *Harvard Business Review*, 82(7/8): 150-160.
- Kasper-Fuehrer, E. C., & Ashkanasy, N. M. 2001. Communicating trustworthiness and building trust in interorganizational virtual organizations. *Journal of Management*, 27(3): 235-254.
- Katz, D. 1964. The motivational bias of organizational behavior. *Behavioral Science*, 9: 131-146.

- Kidwell, R. E., Mossholder, K. W., & Bennett, N. 1997. Cohesiveness and organizational citizenship behavior: A multilevel analysis using work groups and individuals. *Journal of Management*, 23(6): 775-793.
- Kim, W. C., & Mauborgne, R. 1997. Fair process: Managing in the knowledge economy. *Harvard Business Review*, 75(4): 65-&.
- Kim, W. C., & Mauborgne, R. 1998. Procedural justice, strategic decision making, and the knowledge economy. *Strategic Management Journal*, 19(4): 323-338.
- Kimberly, J. R., & Quinn, R. E. 1984. *Managing organizational transitions*. Homewood, IL: Richard D. Irwin.
- Kirkman, B. L., & Rosen, B. 1999. Beyond self-management: Antecedents and consequences of team empowerment. *Academy of Management Journal*, 42(1): 58-74.
- Kirkman, B. L., Rosen, B., Tesluk, P. E., & Gibson, C. B. 2004. The impact of team empowerment on virtual team performance: The moderating role of face-to-face interaction. *Academy of Management Journal*, 47(2): 175-192.
- Klein, J. A. 1984. Why supervisors resist employee involvement. *Harvard Business Review*, 62(5): 87-95.
- Koberg, C. S., Detienne, D. R., & Heppard, K. A. 2003. An empirical test of environmental, organizational, and process factors affecting incremental and radical innovation. *Journal of High Technology Management Research*, 14(1): 21-45.
- Kouvelis, P., & Lariviere, M. A. 2000. Decentralizing cross-functional decisions: Coordination through internal markets. *Management Science*, 46(8): 1049-1058.
- Kurland, N. B., & Egan, T. D. 1999. Telecommuting: Justice and control in the virtual organization. *Organization Science*, 10(4): 500-513.
- Lam, S. S., Hui, C., & Law, K. S. 1999. Organizational citizenship behavior: Comparing perspectives of supervisors and subordinates across four international samples. *Journal of Applied Psychology*, 84(4): 594-601.
- Lawrence, P. R. , & Lorsch, J. W. 1967a. *Organization and environment: Managing differentiation and integration*. Boston: Harvard University Press.
- Lawrence, P. R. , & Lorsch, J. W. 1967b. Differentiation and integration in complex organizations. *Administrative Science Quarterly*, 12(1): 1-47.
- Lee, W. G. 1998. *Mavericks in the workplace: Harnessing the genius of American workers*. New York: Oxford University Press.

- Leenders, R. T., Van Engelen, J. M., & Kratzer, J. 2003. Virtuality, communication, and new product team creativity: A social network perspective. *Journal of Engineering and Technology Management*, 20(1-2): 69-92.
- Leibenstein, H. 1969. Organizational or frictional equilibria, x-efficiency, and the rate of innovation. *Quarterly Journal of Economics*, 83(4): 600-623.
- Leifer, R., & Huber, G. P. 1977. Relations among perceived environmental uncertainty, organization structure, and boundary-spanning behavior. *Administrative Science Quarterly*, 22(2): 235-247.
- LePine, J. A., & Van Dyne, L. 1998. Predicting voice behavior in work groups. *Journal of Applied Psychology*, 83(6): 853-868.
- Levitt, B., & March, J. G. 1988. Organizational learning. *Annual Review of Sociology*, 14: 319-340.
- Lewis, L. K., & Seibold, D. R. 1993. Innovation modification during intraorganizational adoption. *Academy of Management Review*, 18(2): 322-354.
- Lott, A. J., & Lott, B. E. 1965. Group cohesiveness as interpersonal attraction. *Psychological Bulletin*, 64: 259-302.
- Louis, M. R. 1980. Surprise and sense making - what newcomers experience in entering unfamiliar organizational settings. *Administrative Science Quarterly*, 25(2): 226-251.
- Lumpkin, G. T., & Dess, G. G. 1996. Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21(1): 135-172.
- MacKenzie, K. D. 1986. Virtual positions and power. *Management Science*, 32(5): 622-642.
- Maitlis, S. 2005. The social processes of organizational sensemaking. *Academy of Management Journal*, 48(1): 21-49.
- March, J. G. 1991. Exploration and exploitation in organizational learning. *Organization Science*, 2(1): 71-87.
- March, J. G. , & Simon, H. A. 1958. *Organizations*. New York: John Wiley & Sons.
- Mascitelli, R. 2000. From experience: Harnessing tacit knowledge to achieve breakthrough innovation. *Journal of Product Innovation Management*, 17(3): 179-193.
- Matusik, S. F., & Hill, C. W. L. 1998. The utilization of contingent work, knowledge creation, and competitive advantage. *Academy of Management Review*, 23(4): 680-697.
- Mayer, K. J., & Nickerson, J. A. 2005. Antecedents and performance implications of contracting for knowledge workers: Evidence from information technology services. *Organization Science*, 16(3): 225-242.

- Maznevski, M. L., & Chudoba, K. M. 2000. Bridging space over time: Global virtual team dynamics and effectiveness. *Organization Science*, 11(5): 473-492.
- McCrae, R. R., & Costa, P. T. 1987. Validation of the 5-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, 52(1): 81-90.
- McGrath, R. G. 2001. Exploratory learning, innovative capacity, and managerial oversight. *Academy of Management Journal*, 44(1): 118-131.
- Miller, D. 1987. Strategy making and structure: Analysis and implications for performance. *Academy of Management Journal*, 30(1): 7-32.
- Miner, J. B. 2003. The rated importance, scientific validity, and practical usefulness of organizational behavior theories: A quantitative review. *Academy of Management Learning & Education*, 2(3): 250-268.
- Mintzberg, H. 1973. *The nature of managerial work*. New York: Harper & Row.
- Mintzberg, H. 1978. Patterns in strategy formation. *Management Science*, 24(9): 934-948.
- Mitchell, T. R., & Larson, J. R. 1987. *People in organizations: An introduction to organizational behavior*. New York: McGraw-Hill.
- Mizruchi, M. S. , & Stearns, L. B. 2001. Getting deals done: the use of social networks in bank decision making. *American Sociological Review*, 66: 647-671.
- Moch, M. K. 1980. Job involvement, internal motivation, and employees integration into networks of work relationships. *Organizational Behavior and Human Performance*, 25(1): 15-31.
- Morgeson, F. P., Delaney-Klinger, K., & Hemingway, M. A. 2005. The importance of job autonomy, cognitive ability, and job-related skill for predicting role breadth and job performance. *Journal of Applied Psychology*, 90(2): 399-406.
- Morris, J. H., Steers, R. M., & Koch, J. L. 1979. Influence of organization structure on role-conflict and ambiguity for 3 occupational groupings. *Academy of Management Journal*, 22(1): 58-71.
- Morrison, E. W. 1993. Longitudinal study of the effects of information seeking on newcomer socialization. *Journal of Applied Psychology*, 78(2): 173-183.
- Morrison, E. W. 1993. Newcomer information-seeking: Exploring types, modes, sources, and outcomes. *Academy of Management Journal*, 36(3): 557-589.
- Morrison, E. W. 2002. Newcomers' relationships: The role of social network ties during socialization. *Academy of Management Journal*, 45(6): 1149-1160.

- Morrison, E. W., & Milliken, F. J. 2000. Organizational silence: A barrier to change and development in a pluralistic world. *Academy of Management Review*, 25(4): 706-725.
- Morrison, E. W., & Phelps, C. C. 1999. Taking charge at work: Extrarole efforts to initiate workplace change. *Academy of Management Journal*, 42(4): 403-419.
- Mueller, R. K. 1971. *The innovation ethic*. New York: American Management Association.
- Mumford, M. D., & Gustafson, S. B. 1988. Creativity syndrome - integration, application, and innovation. *Psychological Bulletin*, 103(1): 27-43.
- Nadler, J., Thompson, L., & Van Boven, L. 2003. Learning negotiation skills: Four models of knowledge creation and transfer. *Management Science*, 49(4): 529-540.
- Near, J. P., & Miceli, M. P. 1987. Whistle-blowers in organizations: Dissidents or reformers. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, 9: 321-368. Greenwich, CT: JAI Press.
- Nohria, N., & Gulati, R. 1996. Is slack good or bad for innovation? *Academy of Management Journal*, 39(5): 1245-1264.
- Obstfeld, D. 2005. Social networks, the tertius iungens orientation, and involvement in innovation. *Administrative Science Quarterly*, 50(1): 100-130.
- Oldham, G. R., & Cummings, A. 1996. Employee creativity: Personal and contextual factors at work. *Academy of Management Journal*, 39(3): 607-634.
- O'Reilly, C. A., Caldwell, D. F., & Barnett, W. P. 1989. Work group demography, social integration, and turnover. *Administrative Science Quarterly*, 34(1): 21-37.
- Organ, D. W. 1990. The motivational basis of organizational citizenship behavior. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, 12: 43-72. 55 Greenwich, CT: JAI Press.
- Organ, D. W., & Ryan, K. 1995. A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behaviors. *Personnel Psychology*, 48(4): 775-802.
- Ouchi, W. G. 1980. Markets, bureaucracies, and clans. *Administrative Science Quarterly*, 25: 129-141.
- Parker, S. K. 1998. Enhancing role breadth self-efficacy: The roles of job enrichment and other organizational interventions. *Journal of Applied Psychology*, 83(6): 835-852.
- Pearce, J., & Gregersen, H. 1991. Task interdependence and extrarole behavior: A test of the mediating effects of felt responsibility. *Journal of Applied Psychology*, 76(6): 838-844.

- Perry-Smith, J. E., & Shalley, C. E. 2003. The social side of creativity: A static and dynamic social network perspective. *Academy of Management Review*, 28(1): 89-106.
- Pierce, J. L., & Delbecq, A. L. 1977. Organization structure, individual attitudes and innovation. *Academy of Management Review*, 2(1): 27-37.
- Podolny, J. M. , & Baron, J. N. 1997. Resources and relationships: Social networks and mobility in the workplace. *American Sociological Review*, 62(5): 673-693.
- Podsakoff, P. M., MacKenzie, S. B., & Ahearne, M. 1997. Moderating effects of goal acceptance on the relationship between group cohesiveness and productivity. *Journal of Applied Psychology*, 82(6): 974-983.
- Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. 2000. Organizational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research. *Journal of Management*, 26(3): 513-563.
- Quinn, J. B. 1979. Technological innovation, entrepreneurship, and strategy. *Sloan Management Review*, 20(3): 19-30.
- Quinn, J. B. 1989. Strategic change: "Logical incrementalism". *Sloan Management Review*, 30(4): 45-60.
- Ramus, C. A., & Steger, U. 2000. The roles of supervisory support behaviors and environmental policy in employee "ecoinitiatives" at leading-edge European companies. *Academy of Management Journal*, 43(4): 605-626.
- Rank, J., Pace, V. L., & Frese, M. 2004. Three avenues for future research on creativity, innovation, and initiative. *Applied Psychology: An International Review*, 53(4): 518-528.
- Reagans, R., & McEvily, B. 2003. Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly*, 48(2): 240-267.
- Redmond, M. R., Mumford, M. D., & Teach, R. 1993. Putting creativity to work - effects of leader-behavior on subordinate creativity. *Organizational Behavior and Human Decision Processes*, 55(1): 120-151.
- Rosenkopf, L., & Nerkar, A. 2001. Beyond local search: Boundary-spanning, exploration, and impact in the optical disk industry. *Strategic Management Journal*, 22(4): 287-306.
- Rosenkopf, L., Metiu, A., & George, V. P. 2001. From the bottom up? Technical committee activity and alliance formation. *Administrative Science Quarterly*, 46(4): 748-772.
- Rouse, W. B. 1993. *Catalysts for change: Concepts and principles for enabling innovation*. New York: Wiley.

- Ruef, M. 1997. Assessing organizational fitness on a dynamic landscape: An empirical test of the relative inertia thesis. *Strategic Management Journal*, 18(11): 837-853.
- Ruef, M. 2002. Strong ties, weak ties and islands: Structural and cultural predictors of organizational innovation. *Industrial & Corporate Change*, 11(3): 427-449.
- Salancik, G. R., & Pfeffer, J. 1978. Social information-processing approach to job attitudes and task design. *Administrative Science Quarterly*, 23(2): 224-253.
- Saucier, G. 1994. Mini-markers: A brief version of Goldberg's unipolar big-five markers. *Journal of Personality Assessment*, 63(3): 506-516.
- Schein, E. H. 1978. *Career dynamics: Matching individual and organizational needs*. Reading, Mass.: Addison-Wesley Pub. Co..
- Schilling, M. A., & Steensma, H. K. 2001. The use of modular organizational forms: An industry-level analysis. *Academy of Management Journal*, 44(6): 1149-1168.
- Scott, S. G., & Bruce, R. A. 1994. Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, 37(3): 580-607.
- Scott, W. R. 1998. *Organizations: Rational, natural, and open systems*. Upper Saddle River, NJ: Prentice-Hall.
- Seibert, S. E., Crant, J. M., & Kraimer, M. L. 1999. Proactive personality and career success. *Journal of Applied Psychology*, 84(3): 416-427.
- Seibert, S. E., Kraimer, M. L., & Crant, J. M. 2001. What do proactive people do? A longitudinal model linking proactive personality and career success. *Personnel Psychology*, 54(4): 845-874.
- Sewell, G. 1998. The discipline of teams: The control of team-based industrial work through electronic and peer surveillance. *Administrative Science Quarterly*, 43(2): 397-428.
- Shalley, C. E. 1995. Effects of coaction, expected evaluation, and goal-setting on creativity and productivity. *Academy of Management Journal*, 38(2): 483-503.
- Shalley, C. E., Zhou, J., & Oldham, G. R. 2004. The effects of personal and contextual characteristics on creativity: Where should we go from here? *Journal of Management*, 30(6): 933-958.
- Shane, S., & Venkataraman, S. 1996. Renegade and rational championing strategies. *Organization Studies*, 17(5): 751-771.
- Shrout, P. E., & Fleiss, J. L. 1979. Intraclass correlations - uses in assessing rater reliability. *Psychological Bulletin*, 86(2): 420-428.

- Simonton, D. K. 1999. *Origins of genius: Darwinian perspectives on creativity*. New York: Oxford University Press.
- Simsek, Z., Veiga, J. F., Lubatkin, M. H., & Dino, R. N. 2005. Modeling the multilevel determinants of top management team behavioral integration. *Academy of Management Journal*, 48(1): 69-84.
- Smith, K. G., Smith, K. A., Olian, J. D., Sims, H. P., Obannon, P., & Scully, J. A. 1994. Top management team demography and process: The role of social integration and communication. *Administrative Science Quarterly*, 39(3): 412-438.
- Song, J., Almeida, P., & Wu, G. 2003. Learning-by-hiring: When is mobility more likely to facilitate interfirm knowledge transfer? *Management Science*, 49(4): 351-365.
- Sorenson, O. 2003. Interdependence and adaptability: Organizational learning and the long-term effect of integration. *Management Science*, 49(4): 446-463.
- Speier, C., & Frese, M. 1997. Generalized self efficacy as a mediator and moderator between control and complexity at work and personal initiative: A longitudinal field study in East Germany. *Human Performance*, 10(2): 171-192.
- Spreitzer, G. M. 1995. Psychological empowerment in the workplace: Dimensions, measurement, and validation. *Academy of Management Journal*, 38(5): 1442-1465.
- Spreitzer, G. M., & Sonenshein, S. 2004. Toward the construct definition of positive deviance. *American Behavioral Scientist*, 47(6): 828-847.
- Staw, B. M. , & Ross, J. 1987. Behavior in escalation situations: Antecedents, prototypes, and solutions. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, 9: 39-78. Greenwich, CT: JAI Press.
- Staw, B. M. 1976. Knee-deep in big muddy: A study of escalating commitment to a chosen course of action. *Organizational Behavior and Human Performance*, 16(1): 27-44.
- Stewart, G. L., & Barrick, M. R. 2000. Team structure and performance: Assessing the mediating role of intrateam process and the moderating role of task type. *Academy of Management Journal*, 43(2): 135-148.
- Szymanski, K., & Harkins, S. G. 1992. Self-evaluation and creativity. *Personality and Social Psychology Bulletin*, 18(3): 259-265.
- Taggar, S. 2002. Individual creativity and group ability to utilize individual creative resources: A multilevel model. *Academy of Management Journal*, 45(2): 315-330.
- Teachman, J. D. 1980. Analysis of population diversity - measures of qualitative variation. *Sociological Methods & Research*, 8(3): 341-362.

- Teece, D. J., Pisano, G., & Shuen, A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7): 509-533.
- Thompson, J. A. 2005. Proactive personality and job performance: A social capital perspective. *Journal of Applied Psychology*, 90(5): 1011-1017.
- Thompson, J. D. 1967. *Organizations in action: Social science bases of administrative theory*. New York: McGraw-Hill.
- Trice, H. M., & Beyer, J. M. 1993. *The cultures of work organizations*. Englewood Cliffs, N.J.: Prentice Hall.
- Tushman, M. L., & Romanelli, E. 1983. Uncertainty, social location and influence in decision-making: A sociometric analysis. *Management Science*, 29(1): 12-23.
- Van Alstyne, M., & Brynjolfsson, E. 2005. Global village or cyber-balkans? Modeling and measuring the integration of electronic communities. *Management Science*, 51(6): 851-868.
- Van de Ven, A. H. 1986. Central problems in the management of innovation. *Management Science*, 32(5): 590-607.
- Van Dyne, L., & Ang, S. 1998. Organizational citizenship behavior of contingent workers in Singapore. *Academy of Management Journal*, 41(6): 692-703.
- Van Dyne, L., & Ellis, J. B. 2004. Job creep: A reactance theory perspective on organizational citizenship behavior as over-fulfillment of obligations. In J. A. M. Coyle-Shapiro, L. M. Shore, M. S. Taylor & L. E. Tetrick (Eds.), *The employment relationship: Examining psychological and contextual perspectives*: 181-205. Oxford, UK: Oxford University Press.
- Van Dyne, L., Cummings, L. L., & Parks, J. M. 1995. Extra-role behaviors - in pursuit of construct and definitional clarity (a bridge over muddied waters). In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, 17: 215-285. Greenwich, CT: JAI Press.
- Van Dyne, L., Graham, J. W., & Dienesch, R. M. 1994. Organizational citizenship behavior: Construct redefinition, measurement, and validation. *Academy of Management Journal*, 37(4): 765-802.
- Vera, D., & Crossan, M. 2005. Improvisation and innovative performance in teams. *Organization Science*, 16(3): 203-224.
- Walker, M. E., Wasserman, S., & Wellman, B. 1993. Statistical-models for social support networks. *Sociological Methods & Research*, 22(1): 71-98.
- Wally, S., & Baum, J. R. 1994. Personal and structural determinants of the pace of strategic decision-making. *Academy of Management Journal*, 37(4): 932-956.

- Wanberg, C. R., & Kammeyer-Mueller, J. D. 2000. Predictors and outcomes of proactivity in the socialization process. *Journal of Applied Psychology*, 85(3): 373-385.
- Wanous, J. P. 1992. *Organizational entry: Recruitment, selection, orientation, and socialization of newcomers*. Reading, Mass.: Addison-Wesley Pub. Co..
- Wanous, J. P., Reichers, A. E., & Malik, S. D. 1984. Organizational socialization and group development: Toward an integrative perspective. *Academy of Management Review*, 9(4): 670-683.
- Weick, K. E. 1995. *Sensemaking in organizations*. Thousand Oaks, CA: Sage.
- Weick, K. E. 1976. Educational organizations as loosely coupled systems. *Administrative Science Quarterly*, 21(1): 1-19.
- West, M. A., & Anderson, N. R. 1996. Innovation in top management teams. *Journal of Applied Psychology*, 81(6): 680-693.
- Westphal, J. D., & Bednar, M. K. 2005. Pluralistic ignorance in corporate boards and firms' strategic persistence in response to low firm performance. *Administrative Science Quarterly*, 50(2): 262-298.
- Wiesenfeld, B. M., Raghuram, S., & Garud, R. 1999. Communication patterns as determinants of organizational identification in a virtual organization. *Organization Science*, 10(6): 777-790.
- Wiesenfeld, B. M., Raghuram, S., & Garud, R. 2001. Organizational identification among virtual workers: the role of need for affiliation and perceived work-based social support. *Journal of Management*, 27(2): 213-229.
- Williams, L. J., & Anderson, S. E. 1991. Job-satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management*, 17(3): 601-617.
- Wooldridge, B., & Floyd, S. W. 1990. The strategy process, middle management involvement, and organizational performance. *Strategic Management Journal*, 11(3): 231-241.
- Yli-Renko, H., Autio, E., & Sapienza, H. J. 2001. Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22(6-7): 587-613.
- Zahra, S. A., & Nielsen, A. P. 2002. Sources of capabilities, integration and technology commercialization. *Strategic Management Journal*, 23(5): 377-398.
- Zhou, J., & George, J. M. 2001. When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal*, 44(4): 682-696.

Zhou, J., & Oldham, G. R. 2001. Enhancing creative performance: Effects of expected developmental assessment strategies and creative personality. *Journal of Creative Behavior*, 35(3): 151-167.

Zollo, M., & Winter, S. G. 2002. Deliberate learning and the evolution of dynamic capabilities. *Organization Science*, 13(3): 339-351.

VITA

Michael Hendron was born in Walnut Creek, California, August 31, 1971, the son of Gene and Ann Hendron. After graduating from Monte Vista High School, Danville, California, in 1989, he entered Brigham Young University. During his undergraduate studies he took a two-year leave to serve as a missionary for the Church of Jesus Christ of Latter-day Saints in Okinawa, Japan. He completed a Bachelor of Arts degree in Political Science, with minors in Japanese and Business Administration in 1996. Michael began working full-time, prior to graduation, in a business development role with the Japanese trading company Kanematsu, in Sunnyvale, California. Subsequently, Michael completed a Master of Business Administration degree at the Darden Graduate School of Business at the University of Virginia, in 2000. He worked in strategy consulting in the high-tech industry with Alliance Consulting Group and later started his own independent consulting practice, Arcwise Consulting. He continued in this role until entering the doctoral program in Strategic Management at the University of Texas at Austin in 2002. Michael has other industry and managerial experience including work at the U.S. Chamber of Commerce and United Technologies, and a variety of leadership and advisory roles in non-profit organizations. He will begin working as an assistant professor in the Marriott School of Management at Brigham Young University in the summer of 2008.

Permanent Address: 14321 Ballycastle Trail, Austin, Texas, 78717

This dissertation was typed by the author.