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The Social Structure of Organization: 
Coordination in a Large, Multi-Business Firm

a dissertation presented by

Adam M. Kleinbaum

ABSTRACT

My dissertation examines intraorganizational social networks and the role they play in new venture creation in large firms. Multidivisional firms are formally organized to achieve coordination within business unit silos, but those structures often prevent coordination across units for innovation. Social structure offers a potential mechanism to coordinate across divisional boundaries to create new products, enabling multi-divisional firms to realize the benefits of diversification; yet in spite of this, corporate entrepreneurship often proves elusive. In my dissertation, organized as three essays, I explore the reasons why social structure may not promote corporate entrepreneurship effectively.
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EXECUTIVE SUMMARY

"I can't understand how [Time Warner] had Warner Music and AOL and didn't create something like iTunes."

— Jessica Reif Cohen, Media Analyst, Merrill Lynch

Building Bridges: The Social Structure of Interdependent Innovation

In spite of the dismay of industry observers such as Cohen, most large firms fail to take advantage of opportunities to create new businesses that re-combine resources from disparate parts of the firm. Instead, divisions tend to “stay in their own lanes,” developing new products for their existing customers, adopting technologies that enhance the value of their existing competences and generally paying little attention to one another. Even when firms use collaborative incentives or cross-divisional teams, they rarely succeed in recombining their portfolios of skills, resources and businesses to bring new products to light. This inability of multidivisional firms to leverage existing assets is a lost opportunity for innovation and corporate entrepreneurship. In my dissertation, I define and explore a brand of corporate entrepreneurship based on interdependent innovation – the re-combination of resources (e.g., technologies or skills) from different divisions to create new products.
Over the past two decades, scholars have identified many reasons why firms are inertial and resist change, even when change bears new growth opportunities. When change requires building bridges across business unit boundaries, the challenge seems to be even greater. In the first paper of my dissertation, I, together with co-author Michael Tushman, argue that when firms design their organization charts to minimize coordination costs by organizing around the most strategic interdependencies, they render other possible linkages residual to the formal organizational structure. And yet, in firms whose divisions make products that are related, these “residual interdependencies” offer unique opportunities for corporate entrepreneurship; indeed, it has often been argued that the intersection of different disciplines and their respective thought worlds is a potential hotbed for innovation.

Because interdependent innovation is characterized by inconsistency with the organization chart, social structure is paramount. We propose an evolutionary approach to interdependent innovation. In the context of the senior team’s overarching aspiration, a variety of interdependent innovation initiatives are generated autonomously through the creative initiative of individual “idea brokers” – people who maintain broad networks of diverse contacts spread throughout the organization. By virtue of their interactions with such a diverse set of people, these idea brokers are ideally situated to draw connections and to recognize collaborative opportunities between the firm’s many technologies, markets or people who might otherwise never come into contact. While they are well-suited to discovering opportunities for collaboration, idea brokers lack ability to mobilize the resources and organizational support necessary to implement those opportunities. From this pool of ideas, corporate executives proactively select a few innovations as strategic and support their implementation. In contrast to the broad, sparse network of weak ties that is characteristic of brokerage, the optimal network
structure for implementation is one with dense webs of strong interpersonal ties. This cohesive structure enables rich communication of fine-grained and tacit knowledge; trust to encourage the interpersonal and career risks inherent in corporate entrepreneurship; guidance in navigating the unfamiliar terrain of partner divisions; and reduction of inter-group rivalries.

Our theory about the role of social structure in corporate entrepreneurship has at least two important implications. First, it implies a very simple reason why corporate entrepreneurship has remained an elusive goal for many firms: the very intraorganizational social structure that fosters the emergence of interdependent innovation undermines its implementation and vice-versa. Our process model suggests that unless the structure of the intra-firm network is proactively managed, large firms will either be unable to discover collaborative opportunities (due to a paucity of idea brokers) or unable to implement them (due to a lack of dense, cohesive ties). But we further suggest that managers can both invest in and proactively influence the firm’s social structure. Through conferences and training programs, firms can ensure that their managers have opportunities to meet a diverse group of other employees and, in doing so, create a population of idea brokers; through management rotation, firms can bring experience and strong relationships built in one division to bear both in another division and across the divisional boundary. And by populating cross-divisional teams with regard not only to experience and skills, but also to relational resources, managers can create pockets of cohesive network structure around the implementation of new ventures, improving their chances of success.

Interdependent innovation is an important form of corporate entrepreneurship that takes place in the context of the firm’s simultaneously exploiting the stand-alone strategies of its existing lines of business. We extend the literature on corporate entrepreneurship beyond its focus on new venture divisions by looking at forms of entrepreneurship that are more deeply
ingrained in the existing organizational structure; given the oft-lamented difficulty of re-
integrating isolated corporate ventures into large organizations, this is an important contribution
to the field of entrepreneurship.

**Measuring Mail: New Analyses of Electronic Data for the Study of Macro-
Organizational Phenomena**

In seeking to understand the challenges firms face in re-combining resources from
disparate parts of the firm, organizational scholarship has focused primarily in two areas of
inquiry: formal organizational structure and incentives. Both of these areas of study are well-
developed, mature fields, but even together, they offer only a limited understanding of the
challenge of interdependent innovation. Indeed, anecdotal evidence reported by the media
suggests that firms continue to struggle with corporate entrepreneurship, even when they have
complex organizational structures and elaborate incentive programs.

Recently, scholars have begun to call for systematic research into the role of intra-
organizational social networks to complement the research on formal structure and incentives,
but little such research has been done to date. In this paper, we highlight two methodological
challenges to the use of social network analysis to understand interdependent innovation. First,
the kind and quality of data that have typically been collected to conduct network analysis are
inadequate. Most studies rely on network data collected using questionnaires, but such data is
most likely to be both available and accurate when collected from relatively small organizations;
in contrast, in the large organizations engaged in multiple lines of business that provide the
context for interdependent innovation, it is nearly impossible to collect complete, unbiased data
using questionnaires. Thus, the data that are typical of social network analysis are ill-suited to
the study of interdependent innovation. In order to advance substantive theory, advances in
methods of data collection are needed. In this paper, I argue for one solution to this methodological problem: conducting network analysis on the basis of data drawn from electronic communication archives, including e-mail and electronic calendars.

Second, there is a paucity of research that accounts for the embeddedness of the informal structure in the formal. Scholarly work on organization design traditionally focuses on formal structure—how the activities of the firm are allocated into groups; how groups aggregate to form divisions; and the reporting structure among the divisions—while analysts of social networks focus on the informal—which individuals actually interact; but rare has been the attempt to join the two. And yet, the creation of interdependent innovation requires both informal structure, which facilitates the flow of information across boundaries to uncover opportunities to collaborate and to encourage interpersonal trust; and formal structure, needed to institutionalize interdependent innovation, turning ad hoc projects into full-fledged new ventures. To date, the literature has not explicitly developed analyses that combine formal and informal structure. In particular, no measures have been developed, as far as I am aware, of unit-level constructs aggregated up from individual-level data. Thus, the second major goal of this paper is to develop aggregate measures of several important inter-unit constructs—network density, tie strength, and brokerage—based on individual-level data.

The integrative theme for this paper is the methodological innovation of e-mail data, which is uniquely well-suited to study interdependent innovation. After making the case for e-mail data and developing the quantitative measures conceptually, we demonstrate the utility of the measures on a unique data set consisting of over 100 million e-mails and 60 million meetings and teleconferences exchanged among over 30,000 employees of a large firm during a three-month period in 2006.
Communication (and Coordination?) in a Modern, Complex Organization

For empirical analysis of the social structure of interdependent innovation to begin on a solid foundation, we must first understand the underlying social structure of the modern, complex organization. And yet, for reasons described above, this endeavor has never been undertaken before; despite the fundamental role of coordination – and the communication that enables it – to the purpose of organizations, we have little understanding of actual interaction patterns in modern, complex, multi-unit firms. To open the proverbial “black box” and begin to reveal the internal wiring of the firm, this paper presents a detailed, descriptive analysis of the network of communications among members of a large, structurally, functionally, geographically, and strategically diverse firm (hereafter, “BigCo”) that is actively pursuing corporate entrepreneurship through interdependent innovation. The full dataset comprises more than 100 million e-mail messages and over 60 million electronic calendar entries for a sample of more than 30,000 employees over a three-month period in 2006. For all individuals in the sample, we also possess basic organizational, demographic, and social information, including gender, salary band, tenure, business unit, job function, and office location.

We focus on the role of observable (to us) boundaries between individuals in structuring communications inside the firm. Our data enable us to discern three types of boundaries: organizational unit (e.g., strategic business unit, function membership), spatial boundaries (e.g., office locations), and social categories (e.g., gender, tenure within the firm). We conduct many of the analyses in the paper at the level of the pair of individuals: we examine how organizational, spatial, and social boundaries affect the frequency of dyadic interactions.

After generating estimates of the effects of boundaries on the frequency of communication, we then flip this analysis on its head: we calculate person-specific measures of
the degree to which each individual in the sample engages in communications that deviate from the modal pattern of intra- and inter-group interaction in the data. Aggregating across all of an individual’s dyadic exchanges, people who score highly on this variable are category spanners – their interactions connect rarely traversed organizational and social groups. Because communication is dense within most categories and sparse between them, category spanners are far more likely to create the “weak” and “bridging” ties in the organization, enabling them to serve as the idea brokers who generate the requisite variety in our model of interdependent innovation.

In his letter to shareholders in the 1989 annual report, Jack Welch described plans for what would become one of the cornerstone initiatives in his long-tenured leadership of General Electric. Specifically, he wrote of his intention to mold GE into a boundaryless organization, stating, “The boundaryless company we envision will remove the barriers among engineering, manufacturing, marketing, sales and customer service; it will recognize no distinction between domestic and foreign operations – we’ll be as comfortable doing business in Budapest and Seoul as we are in Louisville and Schenectady. A boundaryless organization will ignore or erase group labels such as ‘management,’ ‘salaried’ or ‘hourly,’ which get in the way of people working together.” Leaders of the organization we analyze here similarly have stressed the importance of lateral, cross-division, cross-function, and cross-rank coordination within the company, but the reality is that interaction patterns at BigCo (as we imagine they would at GE as well) appear to follow those of classical organization theory, in which formal organization structures and office locations sharply delimit interaction patterns.

We present too many descriptions of the BigCo communication network to summarize in their entirety here, but a few findings are noteworthy and at least somewhat unexpected. First,
relative to men, women participate in a greater volume of electronic and face-to-face interactions and do so with a larger and more diverse set of communication partners. This finding cannot be explained by gender sorting into different work roles, such as secretarial positions (although there is a gendered division of labor within the firm). Second, organizational boundaries—business unit, job function, and office location—have an enormous influence on who interacts with whom inside the firm. As a summary statistic, we find that relative to two people that share none of these categories in common and who are geographically separated by the sample’s mean dyadic distance, a pair of individuals that shares the same business unit, job function, and office location communicates at an estimated rate that is approximately 1,000 times higher. Third, among all employees, executive-level communication appears to be least (but still very heavily) delimited by the pathways of formal organizational structure. By contrast, in interactions amongst themselves, executives are more inclined to find communication partners similar to themselves (in terms of gender and firm tenure) than are other employees. Finally, the category spanners in the firm are women concentrated in the mid- to high-level (but not the highest) executive ranks and in a few functions, most notably sales, marketing, and general executive management.