© The Academy of Management Perspectives
2014, Vol. 28, No. 4, 353–367.
http://dx.doi.org/10.5465/amp.2013.0096

S Y M P O S I U M

NETWORK RESPONSIVENESS: THE SOCIAL STRUCTURAL MICROFOUNDATIONS OF DYNAMIC CAPABILITIES

ADAM M. KLEINBAUM
Dartmouth College

TOBY E. STUART
University of California at Berkeley

Intraorganizational social networks are known to be important antecedents to individual career attainment, but research examining their influence on firm-level performance has been limited. We argue that the intrafirm network is likely to affect two firm-level outcomes: coordination and adaptability. Prior research has shown formal structure to be a useful tool for reshaping organizational networks, but we argue that firms vary in their rates of *network responsiveness*. When formal organizational structure is changed, as in a reorganization, or when targeted individuals undertake job changes, some firms will experience a rapid reshaping of their networks; in other firms, the network will respond more slowly to the new formal structure. We posit that slow network responsiveness may provide coordination advantages via compensatory fit, whereas fast network responsiveness may facilitate more rapid adaptability. As such, a firm's rate of network responsiveness is a heretofore unexplored source of dynamic capabilities. We illustrate these ideas using case data and empirical examples. We view network responsiveness as a useful means through which the internal network structure of a firm drives ambidexterity, dynamic capabilities, and firm performance.

In pursuit of answers to the fundamental questions of strategy, much scholarship has coalesced around the idea of dynamic capabilities. Within this research community, voluminous effort has been devoted to fleshing out the microfoundations supporting the implementation of dynamic capabilities, with an eye toward offering pragmatic insights to managers. However, a topic of conspicuous omission in the literature on dynamic capabilities, and the focus in this paper, is the role of the internal network structure of the organization in shaping the process and outcome of change efforts. Social networks—the patterns in the interpersonal relationships among organizational members—are of importance because they are the metaphoric foundation on which all coordinated activity in organizations takes place. Individuals rarely act alone in organizations, and they never do so when they are attempting to implement the major tasks of the firm; they work in concert. In this paper, we argue that aspects of the internal network of a firm influence two things—the firm's ability to coordinate and to adapt—which are both crucial aspects of dynamic capabilities, as conceived in the literature.

Coordination is an essential capability for organizations, and networks are necessarily engaged in the execution of coordinated activities. A central teaching of the literature on corporate-level strategy in the complex firm, however, is that it is far from given that coordination emerges organically. In fact, from the classic texts in organization theory (e.g., Galbraith, 1973) to current theoretical and empirical work in corporate finance (e.g., Dessein, Garicano, & Gertner, 2010; Rajan, Servaes, & Zingales, 2000) to the more recent, practitioner-oriented writings on the subject (e.g., Gulati, 2007), establishing coordination across organizational boundaries is recognized as a, if not *the*, key challenge in managing dispersed organizations. Likewise, adaptability—the ability to change the organ-

ization—is a cornerstone of the theory of dynamic capabilities (Helfat et al., 2007; Helfat & Winter, 2011). But affecting it, too, is at best a difficult process in complex organizations. Empirical demonstrations of the challenges of successful adaptation form the base of a large literature that questions the premise that change efforts positively contribute to firm performance (e.g., Amburgey, Kelly, & Barnett, 1993; Sørensen & Stuart, 2000). Likewise, there is a cottage industry of practitioner-directed thinking on the subject of leading organizational change and a vast, profitable industry—management consulting—that is largely devoted to assisting efforts to change organizations.

We argue that social networks are central to at least three internal organizational processes that are vital for implementing both coordination and adaptation. They are an essential component of the process of opportunity identification, which precedes recognition of the need for coordination or change and is how opportunities that are perceived to be compelling are often sourced. They are the pathways of power and influence in organizations, and therefore they are essential for assembling the coalitions that are necessary for change efforts to occur. And they are at the center of resource mobilization. In most organizational settings, resources are fully committed to existing people and projects; to implement change, therefore, resources must be diverted from their current uses.

Part of our objective in this paper is to articulate the view that social networks stand between the decision to undertake change and its outcome, and therefore ultimately must be part of the story in a strategic positioning–based account of dynamic capabilities. This point seems uncontroversial. The bolder and more speculative claim we make is that the network structure of organizations—or, perhaps more important, the pace at which networks inside the firm respond to strategic change efforts—may be an important source of heterogeneity that underpins dynamic capabilities. We label this concept *network responsiveness*, by which we mean the rate at which internal network structures realign to adjustments in formal organizational structure. We illustrate heterogeneous network responsiveness using simple analyses of electronic mail data in two firms. Building on prior research and on several illustrative case studies, we argue that fast network responsiveness promotes adaptability, whereas slow network responsiveness can be beneficial for informal coordination. Thus, viewed dynamically, network responsiveness entails a trade-off: The dynamic capability of rapid network responsiveness may come at the cost of coordination effectiveness.

DYNAMIC CAPABILITIES AND NETWORK STRUCTURE

The dynamic capabilities perspective has become an increasingly important area of inquiry in strategy. Taking as its theoretical foundation the resource-based view of the firm (Barney, 1991; Peteraf, 1993), it asserts that in environments of rapid change, organizational and managerial routines and processes that enable firms to "purposefully create, extend, or modify [their] resource base[s]" (Helfat et al., 2007, p. 1) will help them to achieve and sustain a competitive advantage (for a useful theoretical integration, see Di Stefano, Peteraf, & Verona, 2014). Specific capabilities that have been identified and studied involve research and development (Helfat, 1997), mergers and acquisitions (Karim & Mitchell, 2000), product innovation (Danneels, 2002), and ambidextrous organizational structures (O'Reilly & Tushman, 2013), to cite several prominent examples.

Developing in parallel to, but almost completely independent of, scholarship on dynamic capabilities (cf. Davis, 2013), research that applies the lens of network theory to the internal network structure of organizations abounds in organization theory and, more recently, in strategy. Social networks are the means of coordinating organizational work (e.g., Kleinbaum & Stuart, 2014), the medium through which ideas and information flow (e.g., Reagans & McEvily, 2003), the back channels through which projects gain or lose political support (e.g., Battilana & Casciaro, 2012), and possibly even the avenues of social cognition through which actors interpret information (e.g., Zuckerman, 2005). Much research in this area has focused on theorizing and documenting the network-based positional correlates of benefits that accrue to individuals because of their position in the social structure (reviewed in Burt, 2005). But the implications of this work for *firm*-level performance are not readily apparent, and very little of it has explored the consequences of intraorganizational network structure for the firm itself (reviewed in Blyler & Coff, 2003; cf. Leana & Van Buren, 1999).

Work by Ghoshal and collaborators has argued that relative to markets, firms are an effective locus of social capital and that such social capital is necessary for innovation (e.g., Nahapiet & Ghoshal,

1998). From this argument, it is just a small additional theoretical leap to a network-based determinant of heterogeneity in firm-level performance. For example, Hansen (1999) considered the ways in which social capital may contribute to firm-level advantage by examining how the network structure around projects shapes the speed at which they are completed. Alcácer and Zhao (2012) used patent data to examine the role of intraorganizational networks in controlling outflow of knowledge from the firm. They argue that internal collaborations between a firm's geographic locations serve to strengthen the firm's control over proprietary knowledge, reducing the extent to which knowledge escapes the firm to geographically collocated competitors. Although the current state of the evidence is nowhere near conclusive, a few studies do hint at a possible causal role of intraorganizational networks on firm-level performance (Argote & Ingram, 2000).

Of course, there is a much larger body of research on interfirm networks (e.g., Davis, 1991; Rosenkopf & Almeida, 2003; Schilke, 2014; Stuart, 1998) and a nascent literature on the effects of executives' (observed indirectly, if at all) interpersonal networks inside (e.g., Adner & Helfat, 2003) or outside their firms (e.g., Cohen, Frazzini, & Malloy, 2010; Geletkanycz & Hambrick, 1997; Rider, 2012; Shue, 2013) on organization-level outcomes. The work on inter- (versus intra-) organizational networks does have direct relevance to strategy scholars, and, in fact, from the beginnings of this vibrant area of research, the literature has posited that differences in firm-level positions in interorganizational networks are partial determinants of corporate performance. The discrepancy in the quantity of work that links *intra*organizational network structure to firm performance relative to *inter*organizational networks is easy to understand when one considers the empirical obstacles to persuasive tests of the effect of intrafirm networks on firm-level performance. In addition to now-familiar difficulties surrounding endogenous relationships between network structures and performance (cf. Sorenson & Stuart, 2008), from a research design perspective, it ultimately will be necessary but challenging to assemble network data from many firms to test such a theory.

COORDINATION AND ADAPTATION

In this paper, we argue that intrafirm networks play a critical role in two distinct organizational capabilities: coordination and adaptation. It is no exaggeration to say that the classic theories of the firm are rooted in the coordination benefits of hierarchical control. This is a cornerstone of Weber's (1924/1971) theory of bureaucracy, of Thompson's (1967) classic text on organization theory, and of Williamson's (1975) Nobel Prize–winning argument that when compared to market-based mechanisms, managerial hierarchies efficiently coordinate transactions involving specific assets. Barnard's (1938) treatise on the functions of the executive is devoted entirely to the idea that a complex organization is a coordinated system of action.

Likewise, in the strategy field, there is a longstanding argument that value-creating strategies rest in the synergistic potential of coordinating multiple activities within a single corporate enterprise. Chandler (1962) famously characterized many of the large organizations since the turn of the last century as adopting M-forms, in which operational decisions occur within business units and strategic decisions are managed at the headquarters level. In such organizations, the "visible hand" of senior management centrally coordinates across the diverse units of the corporation (Chandler, 1977). This early work gave rise to the modern literature on corporate-level strategy, which presumes that the multi-business enterprise creates value only if coordination is introduced across the organizational units in the corporate portfolio.

These theories have strong implications for the nature of senior managers' work in complex organizations; all imply that leaders spend a great deal of their time in initiatives that aim to produce coordinated outcomes. Consistent with all of these theories, the quintessentially social nature of managerial work is evident in the fact that the vast proportion of management time is devoted to interacting with others: Classic survey and ethnographic studies of managerial behavior have revealed that leaders spend upward of 80% of their time interacting with other people (Kotter, 1982; Mintzberg, 1973). The implication of extant theories is that organizational members employ their networks, in part, to coordinate activities. This finding, too, is supported in recent analyses of electronic communication networks in a large company (Kleinbaum & Stuart, 2014) and of the calendars of Italian CEOs (Bandiera, Guiso, Prat, & Sadun, 2011). Effective use of the internal network to produce coordinated outcomes is an important capability for multi-business firms (Taylor & Helfat, 2009).

Beyond its role in effecting coordination for the implementation of strategy, a firm's internal social network can also affect its capability for adaptation. There are many reasons why adaptation is a challenge in complex organizations. We cannot, within the scope of this paper, review the vast literature on this subject, but we simply note a few of the major sources of inertia in organizations. First, established organizations necessarily have existing resource allocation profiles (Bower, 1970). Because change involves reallocation of resources, it always produces a set of losers who will resist it; some individuals who had resources in the prior allocation scheme will lose them in consequence of the change (e.g., Pfeffer, 1992). Second, established organizations often suffer from "competency traps": In the presence of a superior skill, the enterprise is induced to continue along its current trajectory. In other words, a honed set of competencies that are well tailored to an existing set of customer preferences often pose an ironic conundrum: When confronted with environmental developments that necessitate change, the organizations that have the weakest incentive to change often are those with skills that are most finely aligned to previous states of the environment (e.g., Tushman & Anderson, 1986). Third, organizations' external constituents—customers, investors, regulators, and so forth—pressure them to demonstrate accountability and reliability, which often leads to the creation of strong self-perceptions of the role of the organization by existing members. This too becomes a potent source of inertia (e.g., Zuckerman, 1999).

How might networks overcome these obstacles and facilitate adaptation? First, information networks can facilitate organizational adaptation by enabling the flow of information in ways that lead to the identification of novel opportunities. Much of the theory of structural holes is premised on the notion that brokers are able to gather and recombine disparate pieces of information productively (Burt, 2005). For example, in Hansen's (1999) study of knowledge transfer across organizational boundaries, networks were shown to promote the sharing of knowledge to accelerate project completion. Moving beyond transfer of knowledge, Kleinbaum and Tushman (2007) theorized about the conditions under which knowledge recombination can be used to explore novel collaborations within large firms, helping them to break out of competency traps.

Second, social networks serve as conduits not just for information, but also for influence. Organizations are political arenas (Pfeffer, 1992) in which the effective implementation of strategy requires enlisting informal support from others, building coalitions, and gaining buy-in (Kanter, 2003). Scholars of organizational change have long recognized the important role that social networks play in all change processes. For example, Kotter argued that a vital task of managers is "using their networks to implement their agendas," (Kotter, 1982, p. 71–75). Consistent with a resource-dependence perspective (Pfeffer & Salancik, 1978), Gargiulo (1993) showed that managers use their networks for political gain both directly, by building ties of interpersonal obligation with people who directly affect their performance, and indirectly, by forging relationships with those on whom their colleagues depend.

More recently, Battilana and Casciaro (2012) provided empirical evidence for these arguments, demonstrating how change agents deploy their networks to overcome resistance to change. Thus, networks are a key medium through which organizational power and influence flow. Such power and influence are particularly important to enabling organizational change when entrenched routines are being challenged and when currently enfranchised organizational members have the power to hinder the firm's ability to move in new directions (Battilana & Casciaro, 2012). Across numerous and disparate literatures, networks have been shown to play an important role in organizational adaptation.

NETWORK RESPONSIVENESS: THE UNDERPINNING OF DYNAMIC CAPABILITIES?

Our argument thus far is that in large, diversified organizations, coordination and adaptability are critical dynamic capabilities.[1] The implementation of either capability is mediated by the internal network structure of the firm: We believe it is impossible to change how an organization coordinates or adapts without mobilizing and reconfiguring networks inside the enterprise. This is because networks are vital to opportunity identification and information exchange; they are vehicles of the influence process, and their topology determines the power structure of the firm. In the remainder of this paper, we argue that when complex organizations undertake significant changes in coordination or

[1] Of course, coordination may, in some situations, be an operational capability (Helfat & Winter, 2011).

adaptation, they in almost all cases implement change by modifying formal organization structure. Our thesis is that there is heterogeneity in how quickly internal networks respond to changes in formal structure, and that such differences in network responsiveness may bear directly on the implementation of dynamic capabilities.

There is much evidence to suggest that formal organizational structure strongly influences a firm's internal network structure. Survey-based studies of intrafirm networks have suggested that an organization's formal structure forms the backbone of the actual relational structure of the firm. For instance, in an analysis of four different types of relations, Han (1996) found that the network of interactions was tightly bound to the formal reporting structure. Although it is not the primary purpose of the paper, a similarly central role of formal structure in shaping networks is evident in Burt's (2004) analysis of social capital in the supply chain function of a large electronics company. And our own investigation of electronic mail networks in a variety of organizations suggests that networks within firms are significantly shaped by formal organizational structure (e.g., Kleinbaum, 2012; Kleinbaum & Stuart, 2014; Liu, Srivastava, & Stuart, 2011).

However, the effect of formal structure on network structure is far from deterministic. Indeed, one of organization theory's most taken-for-granted assumptions is that informal structures of power, influence, and information exchange emerge within organizations (e.g., Roethlisberger & Dickson, 1939). These informal structures are thought to significantly influence interaction patterns, and, indeed, the informal organizational chart is often held to be more consequential than the formal one (Krackhardt & Hanson, 1993; Mayo, 1949/1971). Similarly, social categories such as race, ethnicity, and gender affect networks in ways that may be independent of (Thomas, 1990) or constrained by (Kleinbaum, Stuart, & Tushman, 2013) formal structure.

It is this loose coupling between formal and informal structures that we elaborate in this paper. We argue that a firm's informal structure must necessarily be significantly shaped by its formal structure—that is, networks respond to changes in organizational structure. This uncontroversial observation builds on classic work (e.g., March & Simon, 1958; Thompson, 1967) that suggested that the primary purpose of organizational structure is to shape the patterns of interaction among organizational members, and on empirical work by Katz and Allen (1982), who showed that changes in formal role result in network changes. Specifically, we expect that when formal structure changes—either by moving a single person into a new role or by broader changes in task interdependence because of reorganization—individuals' networks will change in two ways. First, and most immediately, new ties will be forged between those individuals who are newly interdependent as a necessary condition for getting the work done. Second, and no less important, the functionally obsolescent ties that were driven by the old structure will, to some degree, disappear (Burt, 2002), especially when people are constrained in their capacity to maintain their networks.[2] Recent research (e.g., Kleinbaum, 2014; Sasovova, Mehra, Borgatti, & Schippers, 2010) has explicitly documented the occurrence of such longitudinal churn in individuals' networks, and the clear implication of prior research more broadly is that changes in formal structure should cause significant changes in the structure of networks inside the organization.

A question that has not been explored, however, is the rate at which such changes occur. There is no reason to assume that turnover in the network should occur at a uniform rate across all people or across all firms. We propose that both people and firms may be heterogeneous in the rate at which their networks respond to changes in formal structure, and we term such heterogeneity *network responsiveness*. At the individual level, there are numerous reasons to expect heterogeneity in network responsiveness, including tie multiplexity and individual personality. One might expect that individuals whose ties are more multiplex would be slower to sever contact with their former colleagues. Multiplex ties are those with many forms of social relations between the same pair of individuals; these typically are strong ties in which task-based relationships also contain social components, including the exchange of friendship, advice, social support, and so forth (Scott, 1991). Although the task structure of the firm may be the scaffolding on which other relations are overlaid, people whose ties are multiplex will continue to maintain non-

[2] Our theorizing explicitly concerns the responsiveness of the network to the endogenous choice to reorganize the formal structure of the firm, but we note related research on exogenous changes, such as those that occur when interlocking directors unexpectedly die or retire (Palmer, 1983).

task interactions when the task structure of the firm changes, at least for a time. Further, multiplexity seems to be a general property of an individual's network rather than an idiosyncratic function of individual relations (Verbrugge, 1979), so it would be reasonable to expect that people who tend to build multiplex ties would also tend to exhibit slow network responsiveness. More generally, one might expect to find structural determinants (Burt, 2001), micro-level individual differences (Kleinbaum, 2014), or macro-level cultural difference (Chua, Morris, & Ingram, 2008) in people's propensity to maintain contact following the dissolution of a social focus (Feld, 1981).

These differences also play out at the firm level, where organizational culture and employment practices give rise to heterogeneity in network responsiveness. Research has long shown that situational factors such as corporate culture (e.g., Schein, 1985; Wageman & Gordon, 2005) and employment practices (Leana & Van Buren, 1999) strongly influence individual behavior (Davis-Blake & Pfeffer, 1989). We expect that when organizational cultures value collaboration, collegiality, and helpfulness, individuals will tend to retain contacts in their network long after the functional requirements of their jobs necessitate interaction (e.g., Ghoshal & Gratton, 2005).

A culture of collegiality, for example, promotes the formation of multiplex ties, encouraging exchanges of friendship or social support among co-workers. In such firms, networks will respond slowly to changes in formal structure because the friendship and support relations will persist, at least for a time, even after the task relation disappears; we call this *network stability*. Conversely, in firms whose cultures value individualism and efficiency, or that employ high-powered incentives (e.g., Burt, 2002), we expect that individuals will tend to sever contact with their prior colleagues more quickly and more completely when their task-based roles in the organization change. Other organization-level factors that may be associated with differences in individual propensity to maintain their networks include firm age; rates of turnover, growth, or promotion; and geographic layout. The speed of network responsiveness to changes in formal structure has significant, and heretofore unexplored, implications for organizational capabilities.

CASE EXAMPLE: THE CONSEQUENCES OF SLOW NETWORK RESPONSIVENESS FOR CISCO SYSTEMS

Though the evidence is quite anecdotal, a few published case studies hint at the role of network responsiveness in the process of organizational adaptation. In particular, slow network responsiveness may give rise to the coordination advantages of "compensatory fit" (Gulati & Puranam, 2009). Gulati and Puranam's case study of Cisco Systems suggests that when informal ties persist long after changes in formal organizational structure, they facilitate coordination in ways that may not be feasible within the confines of the new structure. In Cisco's case, the company reorganized in 2001, shifting from a formal structure that was organized around customer segments to one organized around technology groups. The purpose of the new structure was to "promote more rapid and cost-effective technical innovation because engineers who formerly worked in separate silos could now exchange ideas, coordinate development, and generate economies through reuse of technological solutions" (Gulati & Puranam, 2009, p. 424); however, this technology-centered formal structure came at the expense of a customer-centered formal structure. Gulati and Puranam argued that following the reorganization, coordination with respect to customer needs occurred not through the formal structure, but through the informal structure:

> [A] deeply entrenched culture of customer advocacy, as well as a pattern of unofficial relationships that survived the change in the formal organization, appeared to have helped Cisco Systems maintain customer responsiveness despite the emphasis of the new formal organization on cost effective technology development. . . . [T]ies between individuals formerly in the same organizational unit persisted even though these individuals now functioned within different units. These ties that persisted from the older organization were typically those that originated in the formal structure—relationships between engineers and customers formed during design and support stages, between leads of engineering teams working on different technologies, and between product marketing and engineering managers. These relationships were primarily work related to begin with. After the reorganization, the work related aspect of these relationships no longer existed—and yet, individuals used these relationships for advice, information, and even gossip. (Gulati & Puranam, 2009, p. 425)

The case provides an apt illustration of Galbraith's insight that "we cannot find authority structures in the form of product divisions, regional departments, programs, functions, etc. which will encompass all the activities which require coordination. There is a major defect in any choice we might make" (Galbraith, 1973, p. vii). In interpreting the Cisco case, Gulati and Puranam (2009) concluded that the informal structure of the firm can provide "compensatory fit" that offsets the inevitable shortcomings of formal organizational structure, facilitating customer-centric coordination even across formal, technology-centric boundaries. That is, the network was slow to respond to changes in formal structure.

But even stable networks are not entirely inert, and ultimately, they must respond to changes in formal organizational structure: "[T]hese beneficial consequences of inconsistencies appeared to have a definite shelf life. . . . [O]ver time, the shadow of the older informal organization began to disappear, exposing the limits of the formal structure" (Gulati & Puranam, 2009, p. 426). Thus, the case evidence from Cisco Systems suggests that its network responded slowly to changes in formal structure and, because of this slow network responsiveness, it was able to capture coordination advantages of compensatory fit, at least for a period. Thus, we propose that slow network responsiveness is a dynamic capability through which a strong organizational culture can create ambidextrous coordination advantages.

CASE EXAMPLE: THE CONSEQUENCES OF FAST NETWORK RESPONSIVENESS FOR *USA TODAY*

Whereas network stability offers ambidextrous coordination advantages, we suggest that network responsiveness offers the dynamic capability of adaptability. A firm with a fast-responding network is one in which changes in formal structure are followed rapidly by corresponding changes in informal structure: People who change jobs tend not to retain contact with their former co-workers very much or for very long. Rapid network responsiveness could be driven by an organizational culture that favors efficiency, focus, or individualism, where little time is wasted in interactions that are not productive to one's current job or where high-powered incentives discourage time spent on task-irrelevant interactions.

Rapid network responsiveness promotes adaptability not only by facilitating the rapid formation of new ties, but also by *severing* interactions that run contrary to the formal organizational structure. As a result, firms are able to minimize time spent on unproductive interactions and avoiding politically motivated resistance to change that could emerge through the informal structure. This perspective is consonant with Helfat and Peteraf's (2003) notion of resource retirement, with Doz and Kosonen's (2008) argument that resource fluidity—and especially decoupling elements of the organization—contributes to strategic agility, with Teece's (2007) discussion of resource reconfiguration as a microfoundation of dynamic capabilities, and with Briscoe and Tsai's (2011) evidence that managers in merging firms will sever ties within their legacy firms to build new ties to the partner firm.

These ideas are illustrated in the early moves of *USA Today* into digital news distribution (Tushman, Roberts, & Kiron, 2005). *USA Today*'s initial response to the threat of digital news was to create formal structural separation of the emerging online business from the core newspaper business in 1994: "Online originated as a 'stand-alone' operation that was autonomous and independent of *USA Today*'s newsroom operations and culture. . . . Online was located several floors away from their print colleagues in their Rosslyn, Virginia, headquarters building" (Tushman et al., 2005, p. 8). Although the new unit was staffed with existing *USA Today* employees—it was initially headed by Lorraine Cichowski, a 12-year veteran of the organization—the structural separation both forced the creation of new ties and deterred continued interaction between the two units, either formal or informal, and the network responded rapidly to this change in formal organizational structure. Following[3] this rapid network responsiveness, Online was able to develop its unique approach to the news business and carve out a productive and profitable response to the threat of digital (Tushman et al., 2005, p. 12). Even though its subsequent history entailed reintegration of both formal structures and networks, the fast network responsiveness that

[3] We are careful to use language here that denotes temporal sequencing but does not imply causality. Although we are fortunate to have access to Gulati and Puranam's (2009) rich qualitative analysis of Cisco, which focuses explicitly on what we call network stability, we know of no such analysis that focuses explicitly on network responsiveness. We believe that this lacuna underscores our contribution, even as detailed case data about intraorganizational networks are hard to come by.

marked its initial foray into digital seems to have played an important role in *USA Today*'s ultimate ability to transition from its exclusively print business model to one that included digital.

ILLUSTRATIVE EMPIRICAL EXAMPLES OF NETWORK RESPONSIVENESS, FAST AND SLOW

Our case examples of Cisco and *USA Today* illustrate the strategic consequences of heterogeneous network responsiveness to changes in formal organizational structure. To demonstrate, at a fine-grained, intraorganizational level, what such variation looks like, we examine illustrative empirical examples of the rate of network responsiveness for individuals at two firms, which we refer to as BigCo and ProCo. BigCo is a global information technology company with more than 30 business units spanning the hardware, software, and services sectors of the technology industry and has been described at length in prior work (Kleinbaum et al., 2013; Kleinbaum, 2012; Kleinbaum & Stuart, 2014). ProCo is a medium-sized law firm headquartered in California with nearly a dozen offices from San Diego to Washington, D.C. As in management consultancies and other professional services firms, there is little permanent formal structure; instead, individuals have a home office and one or more primary practice areas, but specific staffing assignments are made on an individual basis, with people shifting somewhat fluidly between projects depending on clients' needs.

In both firms, we examine network responsiveness by looking at the changes in network structure surrounding a change in formal structure. Specifically, we identify, in each firm, one individual who underwent a significant change in project assignment. In BigCo, we call our subject Bob; in ProCo, we call our subject Pam.[4] Both Bob and Pam remained in the same office locations after their transitions, but both experienced significant changes in their project assignments and, consequently, in the people with whom they had formally prescribed interactions. We then compare the structure of their e-mail communication networks before and after these changes. E-mail is a particularly appropriate source of data for this study because it unobtrusively captures observable interactions (Quintane & Kleinbaum, 2011; Wuchty & Uzzi, 2011). The interactions that are observed will undoubtedly include both formal, prescribed interactions that are directly driven by the change in structure as well as more discretionary, informal interactions comprising task support, friendship, gossip, and other purposes.

In contrast, other data collection methods—such as network surveys—might be biased toward showing fast network responsiveness if respondents overreport those contacts with whom the new structure dictates they "ought" to be interacting (Brewer, 1995). Because our intended contribution here is conceptual, we analyze the case subjects using the most rudimentary of approaches: We report, both quantitatively and graphically, the number of contacts each subject had (defined as a person with whom the subject exchanged at least one e-mail during a given month) both before the change in assignment and in successive months afterward.

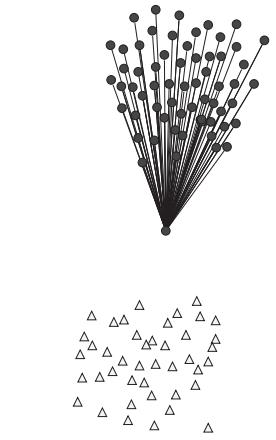
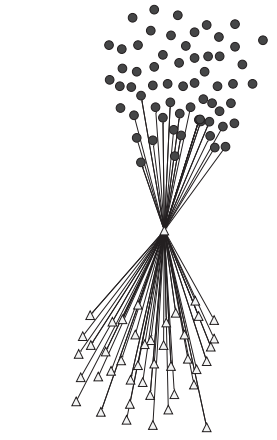
The results illustrate fast network responsiveness surrounding Bob at BigCo (see Figure 1). From one month to the next, Bob's network stayed almost exactly the same size: 63 contacts in June and 62 in July.[5] However, this seeming stability masks a dramatic and rapid underlying shift: Concomitant with the change in project assignment, Bob immediately acquired 42 new contacts. At the same time, and perhaps more surprising, Bob severed interactions with 43 of his June contacts by July. And for the most part, this did not represent a temporary lull in his ongoing relationships because of the busy transition in Bob's professional life: He renewed contact with just 11 of the 43 severed contacts over the following six months. In total, Bob permanently turned over more than half the contacts in his network from one month to the next. This rapid and dramatic churn in Bob's network, depicted graphically in the last row of Figure 1, is consistent with our notion of fast network responsiveness.

In contrast to Bob's rapid network responsiveness, Pam of ProCo experienced a much more gradual change in the composition of her network following a similar change in project assignment. The stability of Pam's network over the five months following her job change is described in Figure 2.

[4] These are pseudonyms used to protect the identities of employees.

[5] Throughout this paper, in both BigCo and ProCo, administrative employees and anyone outside the organization are excluded from our analysis. The contact counts reported therefore represent numbers of professional colleagues.

FIGURE 1
Fast Network Responsiveness at BigCo

	June	July
Total contacts	63	62
Prior month contacts dropped	43 (68% of all June contacts)	
New contacts added	42 (68% of all July contacts)	
Prior contacts retained	20 (32% of all June contacts)	
Network diagram		

Graph shows fast network responsiveness in the network of one BigCo employee, who moved from one project in June to another project in July.

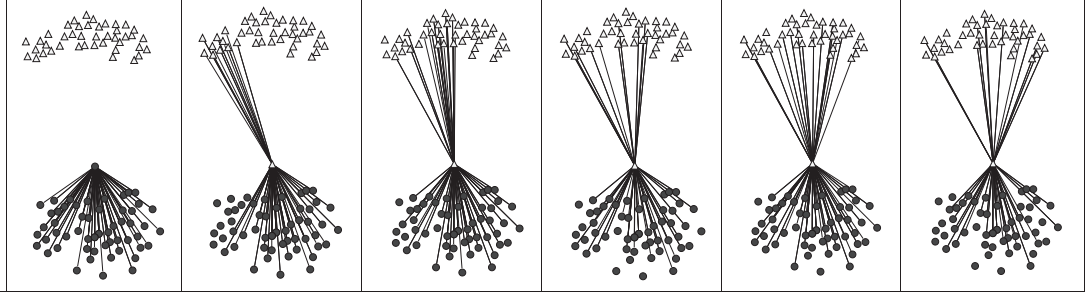
Like Bob's, the overall size of Pam's network was relatively stable, oscillating between 47 monthly contacts and 58. But unlike Bob's, the composition of Pam's network shifted much more slowly. In the first month of her new project assignment, Pam retained over 70% of her prior month's contacts, dropping 16 of them. Over the following months, she continually dropped some contacts and replaced them with others, but as the time series of network diagrams illustrates, Pam seemed to be retaining more intermittent contact with a stable cohort of prior contacts even as she added new ones.

Taken together, Pam added 40 unique new contacts during the five months from February to June. During that period, she also retained some interaction—albeit at a reduced rate—with 50 of her 56 January colleagues, exchanging e-mail with 42 of them in at least three of those months. Whereas Bob appeared to transition sharply from a network that was functional for his old role to a network that was functional for his new role, Pam underwent a much more gradual transition, acquiring many new contacts, immediately severing ties with a few contacts, and phasing out other ties much more gradually. Overall, these empirical data documenting fast and enduring changes in network structure at BigCo and slower, more gradual network changes at ProCo point to the existence of heterogeneity in the rate of network responsiveness that merits further study.

DISCUSSION AND CONCLUSIONS

Conceptual challenges to the feasibility of organizational change have long contrasted with strategic theories that place primacy on adaptability and capabilities-based change. Representing one side of the debate has been the ecologic school of thought in organization theory, most notably Hannan and Freeman's (1984) seminal theory of structural inertia, but there are allied arguments in evolutionary, behavioral, and political theories of the firm, and in recent ideas about the lock-in caused by stable organizational identities. Conversely, the growing influence of the dynamic capabilities perspective places square emphasis on the other side of the coin: It highlights the hazards of remaining static in a world of rapid technological advance, and it advises of the firm's need to "integrate, build, and reconfigure internal and external competencies to

FIGURE 2
Slow Network Responsiveness at ProCo

	Jan.	Feb.	March	April	May	June
Total contacts	56	50	57	47	58	52
Prior month contacts dropped		16 (29% of prior month's total)	10 (20% of prior month's total)	20 (35% of prior month's total)	7 (15% of prior month's total)	24 (41% of prior month's total)
New contacts added		10 (20% of current month's total)	17 (30% of current month's total)	10 (21% of current month's total)	18 (31% of current month's total)	18 (35% of current month's total)
Prior contacts retained		40 (80% of current month's total)	40 (70% of current month's total)	37 (79% of current month's total)	40 (69% of current month's total)	34 (65% of current month's total)
Network diagram						

Graphs show slow network responsiveness in the network of one ProCo employee during the five months following a shift in project assignments. The employee retains 89% of her January contacts—that is, she exchanges e-mail with 50 out of her 56 January contacts at some point between February and June, 42 of them in at least three of those months. During the same time, she acquires 40 unique new contacts from February through June.

address rapidly changing environments" (Teece, Pisano, & Shuen, 1997, p. 516).

In this paper, we seek a theoretical bridge of this divide by offering a perspective about the role of the internal network structure of organizations in shaping the process and outcome of change efforts. We posit that organizations may be heterogeneous in the rate at which their informal structures respond to changes in their formal structures. This heterogeneity may correlate with differences in organizational culture; in firm age; in rates of growth, employee turnover, or promotion; or even in the physical layout of the organization.

Furthermore, we postulate two consequences of this heterogeneity. First, we argue that organizations whose network responds slowly to changes in formal structure are more adept at coordinating through compensatory fit, in which the informal structure enables the dynamic capability of ambidextrous coordination of actions along dimensions that are orthogonal to current, formal structures (Gulati & Puranam, 2009; Tushman & O'Reilly, 1996). Conversely, we argue that network-responsive firms, though they may be more likely to face static coordination challenges, have a dynamic capability of adaptability that enables them to more quickly and more effectively implement changes in formal structures that are intended to reposition the organization to respond to environmental stimuli.

In an entirely anecdotal manner, we have endeavored to illustrate heterogeneous network responsiveness through contrasting dynamic network structures of individuals at two different companies: BigCo, where the individual's network rapidly responded to a change in formal structure, and ProCo, where the network was much more stable in response to a similar change in structure. Fundamentally, network responsiveness is the product of two distinct processes: the acquisition of new ties and the severance of old ones. We have made little distinction between these two processes here because we assume that variation in network responsiveness is driven by the rate of severance of old, functionally obsolescent ties (see also Briscoe & Tsai, 2011; Dahlander & McFarland, 2013). That is, we expect to find few differences across firms in the rate of new tie acquisition in response to formal structural change, because new ties are a functional

prerequisite for role performance.[6] We hope that future research will test this assumption.

Boundary Conditions

In proposing that heterogeneous network responsiveness gives rise to two distinct types of network advantages for firms, it is important to highlight a few boundary conditions of our theory. We suggest that slow network responsiveness may create coordination advantages when firms are simultaneously working toward dual objectives, one of which is supported by the current formal structure and the other of which is supported by the past formal structure and, therefore, by the persistent informal structure. Gains from this dual focus would seem to be prerequisite to the coordination advantages of compensatory fit that result from slow network responsiveness (Gulati & Puranam, 2009). Cisco benefited from the coordination advantages of network stability because it was pursuing the dual advantages of low cost and customer intimacy. The reorganization would suggest a transition in priorities, but through both periods, Cisco clearly valued both.

Fast network responsiveness has precisely the opposite effect. Whereas slow network responsiveness enables a firm to coordinate its activities according to both old and new structures—and, by extension, according to dual strategies—simultaneously (via informal and formal structure, respectively), fast network responsiveness enables clean breaks between the old direction and the new. Fast network responsiveness, therefore, gives rise to advantages of adaptability in firms seeking to move in new directions by making a break with the past (O'Reilly & Tushman, 2008). In contrast with Cisco, *USA Today* benefited from its rapid network responsiveness because it sought to give its emerging Online unit a clean break in transitioning from one strategy to another. We suggest that these two conceptually distinct forms of ambidexterity may be supported by different rates of network responsiveness.

[6] In certain cases, however, the rate of new tie acquisition may be particularly important. For example, prior work documents the formation of new ties between acquired employees and employees of the acquiring firm (Briscoe & Tsai, 2011); such ties might be especially important when the firm is acquired specifically to gain access to its employees (see, for example, Chatterji, 2014).

Extensions

The present work explicitly assumes that networks respond to changes in formal organizational structure. But as scholars of organizational networks, we know that the endogeneity of networks plagues causal analysis. Here, the notion of network responsiveness raises the prospect of an interesting reverse-causal story: that the structure of the intraorganizational network can serve as a leading indicator of underlying market and organizational dynamics that may, ultimately, manifest themselves in changes in formal organizational structure. For example, in the case study of reorganization at Cisco, our earlier analysis focused on the way slow network responsiveness enabled the informal structure to continually facilitate coordination around customer interests, even following the reorganization. Analogously, we might hypothesize that in the time *leading up to* the decision to reorganize around technology groups, engineers working in separate silos, but coming under increasing pressure to innovate at reduced cost, might have used their networks to "exchange ideas, coordinate development, and generate economies through reuse of technological solutions" (Gulati & Puranam, 2009, p. 424) across intraorganizational boundaries. Such network ties could be forged across intraorganizational boundaries because of co-membership in professional associations (Kahl, 2014), for example. If so, these emergent networks exist not as shadows of a previous formal structure, but as nascent structures to which the formal organization has not yet responded. Because the present focus is on network responsiveness and its implication for dynamic capabilities, we leave this interesting corollary for future research to develop.

Limitations

Our objective in this paper is to propose a new perspective on the role of internal network structure on the dynamic capabilities of firms. We illustrate our proposal with both case data from the prior literature and empirical examples of network responsiveness to changes in organizational structure; however, we make no claim that either our case examples or our empirical illustrations constitute definitive evidence of anything. Although our objectives are modest, our work is nevertheless not without limitation. First and foremost, BigCo and ProCo are dramatically different kinds of firms, engaged in completely different businesses with quite

different structures and cultures. We do not claim that the difference in network responsiveness that we observe between Bob and Pam is either representative of their firms or indicative of firm-level differences. Furthermore, we do not claim that either BigCo or ProCo is likely to be better coordinated or more adaptable. Instead, we make the far more modest claim that our empirical results illustrate the kind of heterogeneity in network responsiveness to which we hope to direct future scholarly attention. We leave it for subsequent research to theorize the firm-level antecedents of network responsiveness and to test our theory of its consequences.

We wish to emphasize two points in conclusion. First, we should explicitly highlight a fact that strikes us as too often neglected in the literature on dynamic capabilities, which can be lost in the sometimes-functionalist overtones of this work: Any capability that is optimal for one set of environmental conditions is almost certainly suboptimal when deployed against a different set of conditions. We have affirmatively framed the argument in the paper: We argue that in certain conditions, slow network responsiveness facilitates a coordination-based dynamic capability, whereas fast network responsiveness contributes to a dynamic capability in adaptation.

However, our arguments in the paper are rooted in two suppositions: Organizations vary in how rapidly their internal networks respond to structural changes, and this variance may influence the implementation of different capabilities. To take the final step of linking the rate of network responsiveness to performance advantages requires an additional set of assumptions about the alignment between external conditions and this internal structural feature. For example, in high-velocity environments or environments that are highly disruptive, one might expect that the dynamic capability of adaptation would be critical; thus, fast network responsiveness would lead to better performance outcomes. On the other hand, when change is anticipated and occurs more gradually, the coordination benefits may dominate; under such conditions, the greater stability of slow network responsiveness may lead to better performance outcomes. Certainly, more work is required to clarify the conditions of this contingency story, and therefore to flesh out the performance implications of our argument.

Finally, and more broadly, we believe that any theoryofdynamiccapabilitiesmustextendtointra-organizational processes. We admittedly do not yet have the empirical evidence to establish that network responsiveness is one of the crucial processes that stands between leaders' intentions to change an organization and the actual ability to do so, but we do know that any meaningful change is certain to begin in the initiation of a resource mobilization process that occurs across the existing network structure of the firm. If the change implies a significant departure from the status quo, it is also certain to require that the ties in the existing intraorganizational network will be rerouted. If this is correct, we conclude with the assertion that it presents a prima facie case for bridging the literatures on dynamic capabilities and intraorganizational network processes. The former implies the implementation of major change initiatives, and the latter is always invoked in such undertakings.

REFERENCES

Adner, R., & Helfat, C. E. (2003). Corporate effects and dynamic managerial capabilities. *Strategic Management Journal, 24*(10), 1011–1025.

Alcácer, J., & Zhao, M. (2012). Local R&D strategies and multilocation firms: The role of internal linkages. *Management Science, 58*(4), 734–753.

Amburgey, T. L., Kelly, D., & Barnett, W. P. (1993). Resetting the clock: The dynamics of organizational change. *Administrative Science Quarterly, 38*(1), 51–73.

Argote, L., & Ingram, P. (2000). Knowledge transfer: A basis for competitive advantage in firms. *Organizational Behavior and Human Decision Processes, 82*(1), 150–169.

Bandiera, O., Guiso, L., Prat, A., & Sadun, R. (2011). *What do CEOs do?* (Working Paper No. 11-081). Boston: Harvard Business School.

Barnard, C. I. (1938). *The functions of the executive* (30th anniversary ed.). Cambridge, MA: Harvard University Press.

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120.

Battilana, J., & Casciaro, T. (2012). Overcoming resistance to organizational change: Strong ties and affective cooptation. *Management Science, 59*(4), 819–836.

Blyler, M., & Coff, R. W. (2003). Dynamic capabilities, social capital, and rent appropriation: Ties that split pies. *Strategic Management Journal, 24*(7), 677–686.

Bower, J. L. (1970). *Managing the resource allocation process: A study of corporate planning and invest-*

ment (2nd ed.). Boston: Graduate School of Business Administration, Harvard University.

Brewer, D. D. (1995). Patterns in the recall of persons in a department of a formal organization. *Journal of Quantitative Anthropology, 5*, 255–284.

Briscoe, F., & Tsai, W. (2011). Overcoming relational inertia: How organizational members respond to acquisition events in a law firm. *Administrative Science Quarterly, 56*(3), 408–440.

Burt, R. S. (2001). Attachment, decay, and social network. *Journal of Organizational Behavior, 22*(6), 619–643.

Burt, R. S. (2002). Bridge decay. *Social Networks, 24*(4), 333–363.

Burt, R. S. (2004). Structural holes and good ideas. *American Journal of Sociology, 110*(2), 349–399.

Burt, R. S. (2005). *Brokerage and closure: An introduction to social capital*. New York: Oxford University Press.

Chandler, A. D. (1962). *Strategy and structure: Chapters in the history of the industrial enterprise*. Cambridge, MA: MIT Press.

Chandler, A. D. (1977). *The visible hand: The managerial revolution in American business*. Cambridge, MA: Belknap Press.

Chatterji, A., & Patro, A. (2014). Dynamic capabilities and managing human capital. *Academy of Management Perspectives,* this issue.

Chua, R. Y. J., Morris, M. W., & Ingram, P. (2008). Guanxi vs. networking: Distinctive configurations of affect- and cognition-based trust in the networks of Chinese vs. American managers. *Journal of International Business Studies, 40*(3), 490–508.

Cohen, L., Frazzini, A., & Malloy, C. (2010). Sell-side school ties. *Journal of Finance, 65*(4), 1409–1437.

Dahlander, L., & McFarland, D. A. (2013). Ties that last: Tie formation and persistence in research collaborations over time. *Administrative Science Quarterly, 58*(1), 69–110.

Danneels, E. (2002). The dynamics of product innovation and firm competences. *Strategic Management Journal, 23*(12), 1095–1121.

Davis, G. F. (1991). Agents without principles? The spread of the poison pill through the intercorporate network. *Administrative Science Quarterly, 36*(4), 583–613.

Davis, J. P. (2013). Organizational architecture and dynamic capabilities: Network microfoundations of competitive advantages in dynamic markets. Available at SSRN: http://ssrn.com/abstract=2272774 or http://dx.doi.org/10.2139/ssrn.2272774

Davis-Blake, A., & Pfeffer, J. (1989). Just a mirage: The search for dispositional effects in organizational research. *Academy of Management Journal, 14*(3), 385–400.

Dessein, W., Garicano, L., & Gertner, R. (2010). Organizing for Synergies. *American Economic Journal: Microeconomics, 2*(4), 77–114.

Di Stefano, G., Peteraf, M. A., & Verona, G. (2014). The organizational drivetrain: A road to integration of dynamic capabilities research. *Academy of Management Perspectives,* this issue

Doz, Y., & Kosonen, M. (2008). The dynamics of strategic agility: Nokia's rollercoaster experience. *California Management Review, 50*(3), 95–118.

Feld, S. L. (1981). The focused organization of social ties. *American Journal of Sociology, 86*(5), 1015–1035.

Galbraith, J. R. (1973). *Designing complex organizations*. Reading, MA: Addison-Wesley.

Gargiulo, M. (1993). Two-step leverage: Managing constraint in organizational politics. *Administrative Science Quarterly, 38*(1), 1–19.

Geletkanycz, M. A., & Hambrick, D. C. (1997). The external ties of top executives: Implications for strategic choice and performance. *Administrative Science Quarterly, 42*(4), 654–681.

Ghoshal, S., & Gratton, L. (2005). Integrating the enterprise. *MIT Sloan Management Review, 44*(1), 31–38.

Gulati, R. (2007). Silo busting: How to execute on the promise of customer focus. *Harvard Business Review, 85*(5), 98–108, 145.

Gulati, R., & Puranam, P. (2009). Renewal through reorganization: The value of inconsistencies between formal and informal organization. *Organization Science, 20*(2), 422–440.

Han, S.-K. (1996). Structuring relations in on-the-job networks. *Social Networks, 18*(1), 47–67.

Hannan, M. T., & Freeman, J. (1984). Structural inertia and organizational change. *American Sociological Review, 49*(2), 149–164.

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.

Helfat, C. E. (1997). Know-how and asset complementarity and dynamic capability accumulation: The case of R&D. *Strategic Management Journal, 18*(5), 339–360.

Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M. A., Singh, H., Teece, D. J., & Winter, S. G. (2007). *Dynamic capabilities: Understanding strategic change in organizations*. Malden, MA: Blackwell.

Helfat, C. E., & Peteraf, M. A. (2003). The dynamic re-

source-based view: Capability lifecycles. *Strategic Management Journal, 24*(10), 997–1010.

Helfat, C. E., & Winter, S. G. (2011). Untangling dynamic and operational capabilities: Strategy for the (n)ever-changing world. *Strategic Management Journal, 32*(11), 1243–1250.

Kahl, S. J. (2014). Associations, jurisdictional battles, and the development of dual-purpose capabilities. *Academy of Management Perspectives,* this issue.

Kanter, R. M. (2003). *Leadership for change: Enduring skills for change masters* (Harvard Business School Case). Boston: Harvard Business School Press.

Karim, S., & Mitchell, W. (2000). Path-dependent and path-breaking change: Reconfiguring business resources following acquisitions in the U.S. medical sector, 1978–1995. *Strategic Management Journal, 21*(10–11), 1061–1081.

Katz, R., & Allen, T. J. (1982). Investigating the not-invented-here (NIH) syndrome: A look at the performance, tenure, and communication patterns of 50 R&D project groups. *R&D Management, 12*(1), 7–20.

Kleinbaum, A. M. (2012). Organizational misfits and the origins of brokerage in intrafirm networks. *Administrative Science Quarterly, 57*(3), 407–452.

Kleinbaum, A. M. (2014). *The un-scaffolding hypothesis: A natural experiment on network responsiveness to structural change* (Tuck Working Papers). Hanover, NH: Dartmouth College Tuck School of Business.

Kleinbaum, A. M., & Stuart, T. E. (2014). Inside the black box of the corporate staff: Social networks and the implementation of corporate strategy. *Strategic Management Journal, 35*(1), 24–47.

Kleinbaum, A. M., Stuart, T. E., & Tushman, M. L. (2013). Discretion within constraint: Homophily and structure in a formal organization. *Organization Science, 24*(5), 1316–1336.

Kleinbaum, A. M., & Tushman, M. L. (2007). Building bridges: The social structure of interdependent innovation. *Strategic Entrepreneurship Journal, 1*(1), 103–122.

Kotter, J. P. (1982). *The general managers*. New York: Free Press.

Krackhardt, D., & Hanson, J. R. (1993). Informal networks: The company behind the chart. *Harvard Business Review, 71*(4), 104–111.

Leana, C. R., & Van Buren, H. J. (1999). Organizational social capital and employment practices. *Academy of Management Review, 24*(3), 538–555.

Liu, C. C., Srivastava, S. B., & Stuart, T. E. (2011). *An intra-organizational ecology of individual attainment* (Rotman Working Papers). Toronto: University of Toronto.

March, J. G., & Simon, H. A. (1958). *Organizations* (1993 ed.). Cambridge, MA: Blackwell.

Mayo, E. (1971). Hawthorne and the Western Electric Company. In D. S. Pugh (Ed.), *Organization theory, selected readings* (pp. 355–368). Harmondsworth, UK: Penguin. (Original work published 1949)

Mintzberg, H. (1973). *The nature of managerial work*. New York: Harper & Row.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review, 23*(2), 242–266.

O'Reilly, C. A., & Tushman, M. L. (2008). Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. *Research in Organizational Behavior, 28*, 185–206.

O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *Academy of Management Perspectives, 27*(4), 324–338.

Palmer, D. (1983). Interpreting corporate interlocks from broken ties. *Social Science History, 7*(2), 217–231.

Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal, 14*(3), 179–191.

Pfeffer, J. (1992). *Managing with power: Politics and influence in organizations*. Boston, MA: Harvard Business School Press.

Pfeffer, J., & Salancik, G. R. (1978). *The external control of organizations: A resource dependence perspective*. Stanford, CA: Stanford Business Classics.

Quintane, E., & Kleinbaum, A. M. (2011). Matter over mind? E-mail data and the measurement of social networks. *Connections, 31*(1), 22–46.

Rajan, R., Servaes, H., & Zingales, L. (2000). The cost of diversity: The diversification discount and inefficient investment. *Journal of Finance, 55*(1), 35–80.

Reagans, R., & McEvily, B. (2003). Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly, 48*(2), 240–267.

Rider, C. I. (2012). Employees' prior affiliations constrain organizational network positions: Evidence from U.S. venture capital and private equity. *Administrative Science Quarterly, 57*(3), 453–483.

Roethlisberger, F. J., & Dickson, W. J. (1939). *Management and the worker*. Boston: Harvard University Press.

Rosenkopf, L., & Almeida, P. (2003). Overcoming local search through alliances and mobility. *Management Science, 49*(6), 751–766.

Sasovova, Z., Mehra, A., Borgatti, S. P., & Schippers, M. C. (2010). Network churn: The effects of self-

monitoring personality on brokerage dynamics. *Administrative Science Quarterly, 55*(4), 639–670.

Schein, E. H. (1985). *Organizational culture and leadership* (2nd ed.). San Francisco, CA: Jossey-Bass.

Schilke, O. (2014). Second-order dynamic capabilities: How do they matter? *Academy of Management Perspectives,* this issue.

Scott, J. (1991). *Social network analysis: A handbook*. London: Sage Publications.

Shue, K. (2013). Executive networks and firm policies: Evidence from the random assignment of MBA peers. *Review of Financial Studies, 26*(6), 1401–1442.

Sørensen, J. B., & Stuart, T. E. (2000). Aging, obsolescence, and organizational innovation. *Administrative Science Quarterly, 45*(1), 81–112.

Sorenson, O., & Stuart, T. E. (2008). Entrepreneurship: A field of dreams? *Academy of Management Annals, 2*(1), 517–543.

Stuart, T. E. (1998). Network positions and propensities to collaborate: An investigation of strategic alliance formation in a high-technology industry. *Administrative Science Quarterly, 43*(3), 668–698.

Taylor, A., & Helfat, C. E. (2009). Organizational linkages for surviving technological change: Complementary assets, middle management, and ambidexterity. *Organization Science, 20*(4), 718–739.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal, 28*(13), 1319–1350.

Teece, D. J., Pisano, G. P., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509–533.

Thomas, D. A. (1990). The impact of race on managers' experiences of developmental relationships (mentoring and sponsorship): An intra-organizational study. *Journal of Organizational Behavior, 11*(6), 479–492.

Thompson, J. D. (1967). *Organizations in action; social science bases of administrative theory*. New Brunswick, NJ: Transaction Publishers.

Tushman, M. L., & Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative Science Quarterly, 31*(3), 439–465.

Tushman, M. L., & O'Reilly, C. A. (1996). Ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review, 38*(4), 8–31.

Tushman, M. L., Roberts, M. J., & Kiron, D. (2005). *USA TODAY: Pursuing the network strategy (A)* (Harvard Business School Case). Boston: Harvard Business School Press.

Verbrugge, L. M. (1979). Multiplexity in adult friendships. *Social Forces, 57*(4), 1286–1309.

Wageman, R., & Gordon, F. M. (2005). As the twig is bent: How group values shape emergent task interdependence in groups. *Organization Science, 16*(6), 687–700.

Weber, M. (1971). Legitimate authority and bureaucracy. In D. S. Pugh (Ed.), *Organization theory: Selected readings* (2nd ed.). Harmondsworth, UK: Penguin. (Original work published 1924)

Williamson, O. E. (1975). *Markets and hierarchies, analysis and antitrust implications: A study in the economics of internal organization*. New York: Free Press.

Wuchty, S., & Uzzi, B. (2011). Human communication dynamics in digital footsteps: A study of the agreement between self-reported ties and email networks. *PLOS ONE, 6*(11), e26972.

Zuckerman, E. W. (1999). The categorical imperative: Securities analysts and the illegitimacy discount. *American Journal of Sociology, 104*(5), 1398–1438.

Zuckerman, E. W. (2005). Typecasting and generalism in firm and market: Genre-based career concentration in the feature film industry 1993–1995. In C. Jones & P. H. Thornton (Eds.), *Transformation in cultural industries: Research in the sociology of organizations* (Vol. 23, pp. 171–214). Greenwich, CT: JAI Press.

Adam M. Kleinbaum (adam.m.kleinbaum@tuck.dartmouth.edu) is an associate professor at the Tuck School of Business at Dartmouth. His research examines the determinants and consequences of social network structure within organizations, including how networks unfold dynamically and how formal structure, social categories, and individual factors jointly affect intraorganizational networks.

Toby E. Stuart (tstuart@haas.berkeley.edu) is the Helzel Chair in Entrepreneurship, Strategy and Innovation and faculty director of the Lester Center for Entrepreneurship at the Haas School of Business at UC Berkeley. Much of his current research investigates social networks in organizational and interorganizational settings.