

Corporate Strategy and Network Change

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ABSTRACT: Networks change when either the ties or the nodes are modified. Research on interfirm networks has conceptualized network change as driven almost exclusively by modifications in ties (additions and deletions). Yet firms frequently engage in actions that modify the ownership and existence of nodes: acquisitions ‘collapse’ nodes, divestitures ‘split’ nodes, industry entries ‘create’ nodes, and industry exits ‘remove’ nodes. The literatures on corporate strategy and organizational networks have mostly overlooked the implications of node-modifying actions for network change. We explore those implications in three ways. First, we systematically analyze and compare the network-changing properties of the six node- and tie-changing actions. Second, we link the strategic objectives that boundedly rational firms pursue through each corporate action to changes in their ego network positions (openness, closure, and status). Third, we consider how these ego-network changes set off ripple effects that create externalities for the networks of the focal firm’s immediate partners and that produce unintended structural effects at the global network level. The result is a much more expansive understanding of the mechanisms driving structural change in interfirm networks.

Keywords: network change, corporate strategy, ego networks, global networks, externalities, acquisitions, divestitures, alliances

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All networks are made of two basic building blocks: nodes and ties. The structure of a network is determined by the distribution of ties among the nodes. Hence, structural change is fundamentally a function of modifications in either the ties or the nodes. Yet in the literature on interfirm networks, structural change has been conceptualized almost exclusively as the consequence of changes in ties. Most studies focus on how tie additions alter networks, such as firms establishing alliances or making joint investments (e.g. Ahuja, Soda, & Zaheer, 2012; Gulati & Gargiulo, 1999; Sytch & Tatarynowicz, 2014). Some work has also considered how tie deletions, such as firms ending alliances, modify networks (e.g. Hernandez, Sanders, & Tuschke, 2015; Polidoro, Ahuja, & Mitchell, 2011). The idea that network change can also be the result of alterations in the nodes is virtually missing from research on interfirm networks (with a few exceptions we note later).

Considering node changes in networks composed of firms is crucial for several reasons. First, firms frequently engage in actions that alter the ownership and existence of nodes: acquisitions that “collapse” nodes, divestitures that “split” nodes, industry entries that “create” nodes, and industry exits that “remove” nodes (Hernandez & Menon, 2018). Tie-altering events such as alliance formation and dissolution are also common, but clearly not the only actions firms undertake with the potential to restructure networks. Second, these different node- and tie-changing actions most likely have heterogeneous effects on the structure of interfirm networks. Consider the simplified illustrations in Figure 1. If we take the network in panel 1 as the starting point and move clockwise, it becomes apparent that each action results in quite distinct structural modifications for the firms directly involved in the action (A and B) and for those surrounding them (A1-A3 and B1-B3). Hence, and third, accounting for the full set of tie- and node-changing actions promises to offer a more complete picture of the mechanisms driving interorganizational network change than scholars have so far theorized about.

While interfirm networks research has overlooked node changes, corporate strategy scholars have not conceptualized corporate actions from a networks lens. Phenomena such as acquisitions, divestitures, entry, and exit have been extensively studied in the corporate strategy

literature (e.g. Elfenbein & Knott, 2014; Feldman, 2013; Graebner & Eisenhardt, 2004; Haspeslagh & Jemison, 1991; Shane & Venkataraman, 2000; Villalonga & McGahan, 2005). But the implications of each for network structure have not been of interest in that work. We propose that, when conceptualized from a networks perspective, each corporate action can have a significant effect on the network that surrounds the actors involved in the transaction. Assume that Figure 1 represents an alliance network. When two firms merge, the ‘collapse’ of the acquirer and target may allow the acquirer to inherit the target’s pre-merger alliances. This has the potential to radically restructure the acquirer’s network (Hernandez & Shaver, 2018), as well as to create spillovers for firms that were tied to the acquirer or target before the merger (Hernandez & Menon, 2018). A divestiture, by ‘splitting’ a node in two, creates a new firm to which the parent firm often transfers some of its pre-existing contractual ties. Similarly, a firm’s exit may cause those that remain in the industry to lose valuable ties, while entry brings a new participant into the network with whom others can ally. In the first section of this paper, we systematically analyze and compare the network-changing properties of each of these four node-changing actions and the two well-known tie-changing actions.

Once we lay out the basic properties of each action, we develop propositions linking corporate strategy objectives to changes in network structure. Firms undertake the various actions to achieve corporate objectives such as gaining novel resources (exploration), using existing resources efficiently (exploitation), increasing market power (exclusivity), or enhancing visibility in the market (status) (e.g. Kaul, 2012; Montgomery, 1994; Podolny, 1993). We expect that boundedly rational firms pursue these types of corporate objectives rather than changes in network structure per se; yet the network is an important arena in which the consequences of those objectives are manifested and propagated. We consider two classes of changes in network structure: (a) those affecting the ego network of the focal firm in intended ways, by putting the firm in a position congruent with its corporate objectives; and (b) unintended changes in the broader network, which may or may not be congruent with the firm’s objectives.

For the first class of changes, we relate different corporate objectives to three ego network positions known to be important for firms: openness, closure, and status. For example, openness is congruent with exploration objectives (e.g. access novel resources) while closure fits better with exploitation objectives (e.g. use resources efficiently). We develop propositions about the relative efficacy of the various tie- and node-changing mechanisms in enabling a firm with a two-degree network vision (bonded rationality) to achieve a network position congruent with its corporate objective. To continue with the example, we posit that a node collapse (acquisition) is the most effective action to access novel network resources for firms pursuing exploration goals, because it allows the acquirer to gain multiple new structural holes in a single transaction (Hernandez & Shaver, 2018). In contrast, a node split (divestiture) is better suited to enhance closure for a firm seeking exploitation by focusing on its core business (Berry, 2010), because it can help that firm prune its ties to non-core businesses. We develop similar propositions linking other types of corporate goals to other classes of ego network changes.

While firms pursue corporate goals that modify their ego networks, bounded rationality implies that many unintended network consequences will also arise. Some of those consequences will apply to the focal firm, some will impose externalities on the focal firm's network neighbors, and others will restructure the global network. We thus develop a second set of propositions exploring such consequences. Continuing with the example of firms pursuing exploration objectives, we can—for instance—analyze the consequences of firms using node collapses (acquisitions) to access more structural holes. The detailed arguments cannot be practically laid out in this introduction, but we state some of the posited relationships to illustrate the intriguing implications of our framework. For the focal firm, a positive side effect of acquiring novel bridging partnerships is an attendant increase in network status. The same action imposes an externality on the firms that were connected to the acquirer and target, by increasing their status but closing some of their structural holes. Further, if multiple firms pursue node collapses to gain new structural holes, at the global level the network shrinks as nodes get acquired, become less modular (fewer distinct clusters), and offers fewer opportunities to create

bridging ties. The aggregate consequence is a reduction in exploration opportunities for the average network participant—the very goal that motivated individual firms to engage in acquisitions at the outset. Similar to this particular example, we consider the ripple effects of other mechanisms that firms set off in pursuit of other corporate objectives.

Our main contribution comes from linking the literatures on corporate strategy and interfirm networks, which results in a crucial conceptual advance: network change can be the result of node as well as tie alterations. This advance allows us to consider a novel and more comprehensive set of structure-changing mechanisms than the literature has before. With this framework in hand, we sketch out some links between corporate strategy objectives and changes in the network structure of the focal firm, the externalities those changes impose on the firm's immediate neighbors, and the resulting unintended consequences for the global network. This comprises a complex mix of structural effects, some within the boundedly rational intentions of the focal firm and others far beyond its ability to anticipate. Our initial foray in integrating two important literatures in the field of management offers novel conceptual insights and promises to spur further empirical testing.

BACKGROUND

Concepts from social networks have been used to explain the outcomes of interfirm relationships for many decades. A tremendous body of empirical work on webs composed of alliances, board interlocks, industry associations, or investment syndicates has shown how structural positions (e.g. openness, closure, centrality) affect firms' access valuable resources, which ultimately affects performance. Several papers review the consequences of networks for firm-level outcomes (see Gulati, 1998; Gulati et al., 2000; Kilduff & Brass, 2010; Phelps, Heidl, & Wadhwa, 2012; Zaheer, Gözübüyük, & Milanov, 2010).

The evidence on the consequences of interfirm networks has naturally spawned interest in their antecedents. While more recent, this body of work has grown rapidly (Ahuja *et al.*, 2012 provide a good summary). Research tends to focus on the underlying mechanisms that lead actors to establish or, to a much lesser extent, dissolve ties with one another. For example, the

principle of homophily causes actors with similar attributes to preferentially link with each other, resulting in a differentiated, clustered global structure (Lin, 2001; McPherson, Smith-Lovin, & Cook, 2001). A similar outcome has been observed when actors follow the rule of avoiding ties with rivals (Sytych & Tatarynowicz, 2014). Focusing on ego-network properties, research has suggested that competitive considerations may lead firms to sever ties with those that threaten to leak knowledge to rivals, resulting in a more closed structure (Hernandez et al., 2015). Other work has emphasized how environmental shocks affect the formation of ties (Koka, Madhavan, & Prescott, 2006; Madhavan, Koka, & Prescott, 1998). Work in other disciplines, such as physics and mathematics, has focused on the endogenous dynamics by which networks evolve through processes such as random attachment (Renyi & Erdos, 1959), small worlds (Kogut & Walker, 2001), or scale-free growth (Barabási & Albert, 1999).

As we explained in the introduction, despite the wide variety of theoretical and methodological approaches to studying network change and dynamics, prior literature on interfirm networks has overwhelmingly focused on processes driven by changes in ties. While tie additions and deletions certainly encompass much of what drives network change, from a purely mechanical standpoint at least four other actions can modify the network structure by altering the ownership and existence of *the nodes*. Specifically, (1) nodes can collapse through acquisitions, (2) nodes can split through divestitures, (3) nodes can cease to exist through a variety of events (e.g. bankruptcy, dissolution), and (4) nodes can enter the network through entrepreneurship.

Corporate Strategy and Networks

These node-altering mechanisms represent research traditions in their own right, each a subset of the broader corporate strategy literature. Our purpose here is not to review each of those sub-literatures but, rather, to point out that the implications of each action for networks are relevant—even if they have mostly been overlooked.

This lack of attention to network effects may be reasonable from the perspective of scholars interested in acquisitions, divestitures, entry, or exit per se. After all, each of these events has its own rationale and considerations of external network structure may be secondary

to the objectives of firms. For instance, firms frequently acquire to obtain a specific asset or they divest to lower costs or to focus on their most profitable business. Network effects may be epiphenomenal to the purpose of the transaction. Even then, for network scholars each of the six actions is important if it materially changes the position a firm occupies in a network, albeit unintendedly. For example, if the exit of a firm from the industry dramatically alters the status (i.e. centrality) of those that were tied to the exiting firm, this is a relevant structural implication even if the decline in status was a side effect.

Yet there are many settings in which the network position of a firm is directly relevant for its performance, and in those settings the manner in which corporate strategies modify the network takes on greater importance. Broadly speaking, networks are relevant in when valuable resources are widely distributed across firms and locations. The distributed nature of resources makes it impossible for a firm to possess all it needs to succeed internally, forcing it to partner outside its boundaries. This is true, for instance, of technologically dynamic contexts (Baum, Calabrese, & Silverman, 2000; Tatarynowicz, Sytch, & Gulati, 2016) or of global industries (Ghoshal & Bartlett, 1990). In these contexts, firms frequently engage in alliances, acquisitions, divestitures, or market entry and exit—with much of that activity aimed at improving firms' positions in networks of relationships, resources, and knowledge (Johanson & Vahlne, 2009).

The corporate objectives of firms in settings where networks matter give direction to the process of network change for individual firms and for the system as a whole. For example, a recent study shows that, in technologically dynamic industries, firms tend to develop open networks because gaining novel knowledge—usually associated with structural holes—is central to performance. The same study shows the opposite for technologically stable industries, where efficiency and coordination are paramount: firms pursue goals that lead to closed networks (Tatarynowicz et al., 2016). An even more recent paper shows that acquirers are more likely to choose acquisition targets whose external alliances, when combined with those of the acquirer, enhance the acquirer's network status and its access to structural holes (Hernandez & Shaver, 2018). Neither of these papers prove that firms are choosing to modify their networks directly.

The point is that the overarching strategic objectives of firms are manifested in the network structure—yet the implications of this insight have not been fully developed in the literature.

There are a few other, more distant, precedents linking corporate strategies to network-relevant issues. For instance, Rogan and Sorenson (2014) advocate a relational perspective on acquisitions by showing that common client ties between advertising agencies increased the odds of a merger among agencies. Rogan (2013) and Rogan and Greve (2014) further demonstrate that mergers between agencies trigger the loss of clients, and explore the relational and strategic factors that enhance or diminish the odds of such tie losses. Other research argues that firms can increase their power in the industry by acquiring suppliers or buyers (Burt, 1983; Devos, Kadapakkam, & Krishnamurthy, 2009; Williamson, 1975). While not couched in network terminology, that research implies that corporate actions have ‘vertical’ network effects by reducing the number of buyers and suppliers with whom the firm has to bargain. These precedents underscore the importance of understanding how corporate actions modify networks, but their focus is dyadic in the sense that changes to external ties affected by acquisitions are limited to pairs of firms.

We build upon the implications of this prior work but emphasize different issues. We focus on how the *structure* of the network changes as firms pursue specific corporate objectives. This differs from the loss or gain of dyadic ties, which is the focus of prior work. Crucially, we explore the full set of tie- and node-changing actions—additions, deletions, collapses, splits, entries, and exits—rather than just one corporate action. And we link firms’ pursuit of corporate objectives to structural outcomes, through the six structure-modifying mechanisms, at two levels: the ego network (e.g. openness, closure, and status) for the focal firm and its network neighbors, and the global network (e.g. size, modularity). To do so, however, we must first consider some of the basic network properties of the six corporate actions.

NETWORK PROPERTIES OF CORPORATE ACTIONS

In this section we consider some of the basic properties of the six network-changing corporate actions, independent of any corporate objectives. This offers a foundation for the

higher-order exercise of linking individual actions to specific corporate objectives (which we consider in the following section). Here we specify the basic mechanics of how each action affects interfirm networks, along with some assumptions and clarifications relevant in a corporate strategy context. Table 1 summarizes some of the main issues.

We note a few general points and assumptions before getting into features of specific actions. First, our ideas apply most directly to networks composed of formal, contractual ties between firms (e.g. alliances); many of the concepts may be applicable to networks of informal (non-contractual) ties. Second, we generally take actions as given, meaning that we are interested in what happens to the firm's external network once an action occurs. We do not address the myriad factors that led to the occurrence of an action (e.g. competition, cost, mutual dependence), unless that factor is relevant for how an action subsequently modifies the network structure. Third, we hold constant attributes of network ties (e.g. strength, multiplexity, longevity) because they are not inherently structural properties, and we prefer to keep our theorizing as parsimonious as possible.

*** FIGURE 1 AND TABLE 1 HERE ***

Tie Addition

A tie addition is the formation of a link between two nodes (Figure 1, Panel 1 to 2). Tie additions do not involve the transfer of ownership from one party to another, with each organization remaining independently controlled. Hence, additions are strongly two-sided because both parties have to consent to establishing the relationship, although power imbalances may allow one party to have more sway than the other (Emerson, 1962). We will take the formation as given and not try to explicate who ties with whom.

The primary purpose of establishing interorganizational ties is to gain access to valuable resources such as information, tangible or intangible assets, or social support (Lavie, 2006; Lin, 2001). In that sense (and rather obviously) tie additions are “additive” because they enhance the stock of resources for at least one, but usually both, of the parties involved. Additions are

straightforward from a structural standpoint because they primarily affect the two nodes involved in forming the tie, though they may at times create minor externalities for the network structures of those immediately surrounding the two firms establishing the tie.

From an ego network standpoint, additions mechanically increase the degree of each participant by one unit. How additions modify other structural attributes (e.g. structural holes, status) cannot be mechanically predicted independent of some overarching objective guiding the tie formation (which we discuss in the next section). However, it seems clear that any network change will be small for each addition. This is assuming that a single tie addition does not usually materially affect the other ties of the two parties involved in forming the tie. We base this assumption on the fact that boundedly rational firms usually establish alliances individually, focused on the resource-access objective of that particular alliance rather than on orchestrating wholesale modifications of their alliance portfolios (e.g. Capron & Mitchell, 2012).

Tie Deletion

A tie deletion is the termination of a link between two independently owned nodes (Figure 1, Panel 2 to 1), with no transfer of ownership or control when a tie ceases to exist. Deletions are subtractive in the sense that the two nodes have access to fewer resources post-termination (all else equal), and their structural effects are relatively small because they affect mainly the two involved parties by reducing their degree by one unit. Tie deletions are more one-sided than tie additions: one party can usually exercise its right to terminate a contractual agreement when the benefits of the partnership do not meet its objectives (given a reasonable exit cost). As before, power imbalances may change this calculus, but for our purposes it is not necessary to make assumptions about the distribution of power across actors. As with tie additions, we assume that firms usually consider the benefits and costs of maintaining vs. terminating alliances individually, so that a single deletion does not materially affect the other ties of the two parties.

So far, we have considered the two tie-changing actions, which are familiar to network scholars. We now turn to the four node-changing actions, for which there is less precedent.

Node Collapse

When a firm makes an acquisition, it inherits the assets of the target. These assets include both tangible and intangible elements that, combined with the assets of the acquiring firm, are meant to create synergistic value (Haspeslagh & Jemison, 1991). While the overwhelming focus of M&A research is on the assets internally owned by the acquirer and target, a pair of recent studies considers of how combinations of external ties are potentially useful when one firm takes ownership of the other—even if those ties are not fully controlled by an acquirer (Hernandez & Menon, 2018; Hernandez & Shaver, 2018). These may include ‘vertical’ relationships with suppliers or buyers as well as ‘horizontal’ relationships with collaborators or complementors.

From a networks lens, an acquisition represents the collapse of two nodes into a single node (Figure 1, Panel 1 to 3). Unlike changes in ties, acquisitions provide an acquirer with ownership and thus control of a target’s contractual ties (e.g. alliances), which gives an acquirer influence over another ego network. Inasmuch as the acquirer inherits a fraction of the pre-acquisition ties of the target, an acquisition can modify the network structure. This change is most obvious for the acquirer, who in one transaction gains several new ties. But others beyond the acquirer and target may be affected, such as those that were linked to the acquirer or target, leading to network externalities (e.g. see the effect of the A-B collapse on the position of A1-A3 and B1-B3 in Figure B). Depending on the number of ties affected by the acquisition, the magnitude of the structural change for an acquirer and its network neighbors can be quite large—especially compared to individual tie additions or deletions.

The effects of node collapses may be additive or subtractive: they can enlarge the pre-existing ego network of the acquirer through the inheritance of new partnerships from the target, or they can help eliminate redundant pre-acquisition ties between the acquirer and target (Hernandez & Shaver, 2018). Figure 2a illustrates the additive scenario by showing how Hyseq was able to add ten new alliance partners and effectively double the size of its ego network after acquiring Variagenics (Hamilton, 2002). Figure 2b illustrates the subtractive scenario by showing how Solexa was able to eliminate the redundancies between its ties and those of Lynx

by consolidating the two alliance portfolios post-acquisition (Business Wire, 2004). Both of these are real acquisitions. Of course, these are stark examples meant for illustrative purposes—a single acquisition can have both effects by adding some new relationships and consolidating others. For expositional clarity, we will distinguish between additive and subtractive node collapses when relevant.

*** FIGURES 2A AND 2A HERE ***

A few assumptions guide our understanding of how node collapses lead to structural change. We expect that acquisitions are moderately one-sided, meaning that an acquirer has reasonable latitude in acquiring a target it desires provided it pays what the target perceives it is worth. Of course, a target has choice in the process of being acquired, including rebuffing a takeover attempt. Hence the “moderately” one-sided assumption. Yet inasmuch as the target also has a duty towards the financial well-being of its stakeholders, the price mechanism is a powerful means for a buyer to convince a seller. Because our focus in the remainder of the paper is on the structural consequences of node collapses rather than on their antecedents, we take realized node collapses as given.

More germane to the network effects of node collapses are our assumptions about what happens to network ties post-acquisition. Here we make three assumptions. First, we expect that an acquirer maintains the majority of its pre-acquisition ties. Acquisitions are made with reference to building on the existing business of the acquirer, rather than the target’s business (e.g. Haspeslagh & Jemison, 1991). Hence, the majority of the acquirer’s business—including its pre-existing alliances—remains (but not without some modification) after a deal.

Second, for additive node collapses (i.e. those that bring new ties to the acquirer), we expect that the acquirer keeps a majority of the target’s contractual ties. If there is value in the alliances and agreements of the target, the acquirer will want to keep them. The desire to keep these by itself may not be sufficient because many contractual alliances have “change of control” clauses by which one of the parties has the right to terminate the agreement in the event of an acquisition (Das & Teng, 1999). Yet the duty of due diligence during the pre-acquisition phase

requires the acquirer to ensure that valuable assets—including “contract-based intangible assets”—can be retained post-acquisition (AICPA, 2016). Acquisitions for which desirable external partnerships cannot be retained would go unrealized, and for those that are realized firms would take the proper post-merger integration steps. Hence, there is a form of survivor bias in which realized node collapses are those for which the fraction of desirable relationships of the target is maintained (see Hernandez & Shaver, 2018 for evidence and more discussion). This assumption may not always apply to non-contractual, informal ties.

Third, we assume that for subtractive node collapses, where value arises from eliminating redundant ties that the acquirer and target have to the same third party, the due diligence process would be aimed at ensuring that consolidating contracts under a common new owner is possible.

Node Split

When a firm divests part of its business, it creates a separate entity with its own tangible and intangible assets. These assets are transferred from the parent firm to the new entity. From a networks standpoint, a divestiture is the creation of a new independently owned node. Because firms usually divest to get rid of non-core activities (Feldman, 2013; Zuckerman, 2000), the parent is likely to transfer control of the external relationships attached to those activities to the new entity. Hence, the parent firm’s ties relevant to core businesses remain linked to the parent and the ties relevant to the non-core (divested) business are now linked to the newly created firm (Figure 1, Panel 1 to 4). Like with node collapses, node splits have potentially strong effects on the structural position occupied by the two organizations directly involved as well as on the nodes in the network neighborhood surrounding the parent and the new firm.

Node splits are strongly one-sided because the parent firm has unilateral decision rights over whether to divest in the first place and over which assets get transferred to the new entity. The effects of divestitures are subtractive for the parent firm because it is likely to shed ties associated with businesses it no longer considers desirable. Of course, there are many divestitures in which the parent firm wishes to shift its relationship with a business from ownership to contractual access (e.g. vertical disintegration by spinning off a supplier), by which

the parent “creates” a tie to the new node. This special case would create one new tie for the parent and, mechanically speaking, be additive by one degree. However, there are likely other pre-existing alliances associated with the non-core business that get transferred to the new firm and thus are removed from the parent’s ego network. This is nicely illustrated in Figure 3, which depicts the ego networks of eBay and PayPal before and after their 2014 split. Before the divestiture, eBay as a single entity had alliances with GM, YoungBae, Japan Postal Service, SoftBank, Sotheby’s, Ponto Frio, MoneyGram, and TouchBistro. The latter three alliances were formed by the PayPal business, so we surmise that they were transferred to PayPal after the split. Further, we know that eBay and PayPal maintained a contractual alliance after becoming independent firms. The addition of one tie for eBay (with PayPal) was counterbalanced by the “loss” of three ties (Ponto Frio, MoneyGram, and TouchBistro). To be clear, we are not claiming that divestitures are always subtractive for the network of the parent firm, only that they frequently are.

The eBay-PayPal example is helpful for illustrative purposes because it was well publicized but, like most high-profile divestitures, it is unusual because PayPal represented a very large share of eBay’s operations. More commonly, firms divest businesses that represent a minority of their total operations (hence the common reference to “non-core” businesses in the literature). We thus assume that, while parent firms seek to disassociate themselves from the divested business and most of its attendant ties, parent firms lose only a minority of their total pre-divestiture alliances due to node splits.

Node Entry

From a networks lens, an entry creates a new node (Figure 1, Panel 1 to 5). If the new node is an isolate, as is often the case with young and poorly resourced firms, it will have no impact on the structure of the network. However, a new firm may create opportunities for incumbents to develop new ties in ways that could impact the structure of the incumbents’ pre-entry network. For example, a new entrant may offer novel vertical (supplier, buyer) or horizontal (e.g. complementor, alliance partner) channels of resource exchange. In this sense,

node entry has additive network effects for incumbents connected to the entrant. The effects are likely to be small, however, for two reasons. First, like with tie additions, a single new node mostly allows incumbents to establish one new tie (a net increase of one degree) rather than multiple ties at once. Second, the aggregate effects on all network participants are likely to be small because new entrants typically lack the resources and status to be attractive to many incumbents. The magnitude by which an entrant impacts the network may vary across de novo (a startup) vs. de alio (an existing firm in another sector) entrants. De novo entrants, due to resource and status constraints, have fewer ties to incumbents upon entry than de alio entrants. However, we expect that new entrants in general are not as well connected as incumbents.

Node Exit

When a firm ceases to exist as a going concern, it dissolves both its tangible and intangible assets—including external relationships. Hence an exit is a one-time event that eliminates an entire ego-network (Figure 1, Panel 1 to 6). While its effect on the exiting firm is straightforward (it disappears, and its degree drops to zero), its impact on firms that had ties to the exiting firm depend on how they were positioned relative to the exiting firm. These effects on the remaining actors could be strong if, for example, the exiting firm was a bridge between a remaining firm and a valuable resource provider in the network. Node exits are subtractive in nature for incumbents. We note that exit differs from a change in ownership. For example, firms could go bankrupt or strategically exit an industry, but whether their exit affects the networks of the remaining firms depends on what happens with the assets. If the assets are liquidated, the structural effects we are considering here will take place. However, if a new owner acquires the business in its entirety and continues to run it, the node and its relationships do not disappear—and the network can remain intact. We are not concerned with this latter scenario, although it may be interesting in future research.

*** TABLE 2 HERE ***

Laying out the mechanical properties of these actions suggests that studying their effects on networks merits further attention. Table 2 juxtaposes the six network change mechanisms we have identified (in the rows) with three ego network positions commonly studied for interfirm networks: openness vs. closure, and status. We reference papers that study changes in each outcome driven by each of the six mechanisms. The table reveals several ‘white spaces’ in the literature. We could not identify published research on how divestitures, entries, or exits produce changes in network structure and only very recent work has linked acquisitions to network outcomes.¹ As expected, research on tie additions and deletions is more abundant (only a few representative articles are included in those cells). Hence the scope for work linking corporate strategies to network dynamics is large. This motivates our focus in the remainder of the paper.

CORPORATE OBJECTIVES AND BOUNDED NETWORK RATIONALITY

The central interest of this study is in how the structure of interfirm networks changes as firms use various corporate actions to accomplish their strategic objectives. In the previous section, we discussed some of the ‘mechanical’ attributes of the six actions. How networks actually change as a result of those actions will depend on the strategic objective a firm is trying to accomplish via those actions. In this section, we offer a brief summary of the types of objectives firms pursue through corporate strategies and then specify some important assumptions about rationality in the network domain. This will allow us, in the remainder of the paper, to develop propositions linking corporate actions to changes in network structure.

Objectives of Corporate Strategies

The corporate strategy literature usually discusses the benefits of actions such as acquisitions, divestitures, and alliances in terms of value creation or synergy (Haspeslagh & Jemison, 1991; Lavie, 2006; Rabier, 2017). These benefits take on myriad specific forms—focus, economies of scale or scope, revenue gains, cost savings, shared resource efficiencies, etc. These various benefits can be reduced to four classes of objectives: (1) exploration: gaining

¹ There is work on node exit in other fields that study networks, such as physics (e.g. Callaway et al. 2000), and a few papers in organizational studies use exits as sources of exogenous variation (e.g. Azoulay et al. 2010; Uribe, 2018). That work is relevant as a precedent but does not link firm-level networks to structural change.

novel resources, (2) exploitation: using existing resources more efficiently, (3) exclusivity: gaining market power by having exclusive control of resources, and (4) status: becoming a preferential seller in the market. These four categories are not exhaustive of all the benefits firms seek through corporate strategy, but they do represent some of the most important types discussed in the literature. They stem from three theoretical paradigms: theories of resources/capabilities and market power inform the first three (see Montgomery, 1994) and the theory of status signals informs the last one (Podolny, 2005).

The first two objectives are rooted in theories of resources and capabilities. Firms often need to pursue innovative or novel courses of action. Because firms often lack the know-how, technology, or assets to pursue those novel actions, they use corporate strategies to reach outside their boundaries and obtain new resources (Capron & Mitchell, 2014). We will use the term “exploration” as shorthand for this type of objective. At other times, however, firms need to focus on what they already have and make better use existing resources to be more efficient. This can be accomplished in part by shedding unnecessary assets, usually discussed in terms of distinctions between core and non-core businesses (e.g. Feldman, 2013). We will call this type of objective “exploitation.”

The other two objectives are based on theories of market influence. There are two related but distinct ways of gaining such influence. One is to increase profits through monopoly-like power, which happens as firms use corporate strategies to gain control of scarce resources in interactions with other actors. Gaining direct control of scarce resources provides leverage over vertical (suppliers, buyers) or horizontal (rivals) actors in the marketplace (Burt, 1983: 198; Devos et al., 2009). We will call this “exclusivity.” The other way to gain influence is to enhance the firm’s status so as to become the seller of choice for buyers. Status is especially valuable under conditions of uncertainty because it functions as a signal of quality that reduces buyers’ need to ascertain true quality (e.g. Podolny, 2005). We refer to this final objective as “status.”

Bounded Rationality and Network Action

In the pursuit of the aforementioned corporate objectives, the actions that firms undertake (e.g. mergers, divestitures, tie formation, tie dissolution) can modify the structure of the network. Some changes may be epiphenomenal to the corporate goals driving the actions, while others may be in line with what firms intended. How intentional structural change is for firms becomes an extremely complex issue for all research on interorganizational networks (Ahuja et al., 2012). We do not resolve that general issue. Rather, we make explicit our own assumptions about network agency as they pertain to firms involved in corporate strategies.

We assume that firms are boundedly rational actors. That is, managers have in mind the types of corporate goals laid out in the previous section, and know that achieving them often requires and leads to changes inside the firm and in the firm's external environment. The external environment includes relationships with other firms and entities. However, managers' vision of the external networks generated by those relationships is highly limited. In networks research, there is a general agreement—often tacit—that actors' ability to see or map out the structure of their networks declines with path distance (e.g. Tatarynowicz et al., 2016).

Based on the literature on interfirm alliances and our own discussions with managers, we adopt a “two-step rationality” assumption: organizational attention is drawn to what happens within two degrees of separation (their immediate network neighborhood). That is, ego is aware—and has a reasonably accurate picture—of its ego network and of the direct contacts of its (ego's) alters. Beyond that, ego's awareness drops significantly, making it hard to understand the structure of the broader network or how ego's actions map onto it. But firms are not trying to restructure their networks *per se*. Changes in the immediate network result from the pursuit of *corporate* objectives, with a two-step understanding of how pursuing those objectives might impact the network.

For the purposes of acquisitions or tie additions, we assume that a focal firm can become aware of a target node outside the range of two-step visibility. Although alliances lead to subsequent acquisitions and repeated ties in some cases (Gulati, 1995; Higgins & Rodriguez,

2006), firms frequently acquire or partner with others to whom they have no direct or indirect ties. For example, a firm may learn about a potential target through the media, by competing with the other firm in the market, through the advice of a consultant, or other channels. (The assumption about finding potential targets beyond the two-step boundary is not necessary for node splits, exits, or entries because these actions do not involve a target firm.) Once firms become aware of a potential acquisition or tie formation target, the two-step rationality assumption applies as firms consider the network implications of acquiring or partnering with that target. Namely, the focal firm can focus its attention on the network consequences of acquiring or partnering with that target within two-degrees (similar to what the focal firm would “see” if it were evaluating its own network). This is congruent with the normal due diligence process expected when firms undertake corporate actions, as we explained earlier.

These bounded rationality assumptions are consistent with the corporate strategy literature. For instance, corporate actions would not occur if managers did not have at least a rudimentary understanding of the opportunities and threats in the external environment (Andrews, 1971). In terms of contractual ties specifically, the two-step assumption is congruent with research on the management of strategic alliance portfolios, which consist of ties in the immediate network neighborhood of the focal firm (Kale, Dyer, & Singh, 2002; Wassmer, 2010). Further, managers’ own explanations of their actions suggest that they (sometimes) consider implications for their immediate networks. Hernandez and Shaver (2018) provide a useful example of the 2004 acquisition of Atrix by QLT:

“The press briefing mentioned the expected synergies coming from “economies of scale, distribution synergies, [and] complementary product portfolios” (PR Newswire, 2004), but it also added that Atrix’s “established strategic alliances with such pharmaceutical companies as Pfizer, Novartis, Sanof-Synthelabo, Fujisawa and Aventis” were important sources of value for QLT (PR Newswire, 2004) ... “This transaction will accelerate both companies’ strategic initiatives [through] multiple partnered commercial and near commercial products ... beyond what either company might have achieved independently” (PR Newswire, 2004).”

This example illustrates a few features of our bounded rationality assumptions. First, that QLT's objective was not about the network per se, but about corporate goals (increase scale, grow the product portfolio). Second, it shows QLT's awareness of the first-order partnerships of Atrix, and of how the value implied by the corporate objective could be manifested in the combined "multiple partnered" agreements—the external networks—of the two firms. And third, it suggests that QLT was focused on a very limited range of network ties. We believe the two-step assumption preserves a realistic balance between the corporate strategies and cognitive limitations of even the most strategic actors (Padgett & Ansell, 1993).

Our propositions stem from these assumptions of bounded rationality, which lead us to distinguish between (imperfectly) intended outcomes at the ego-network level and unintended outcomes at the broader network level. We consider both types of outcomes in the propositions.

Caveats. Before proceeding to the propositions, we offer two caveats. First, our focus on corporate objectives requires us to consider how individual actions affect the *focal actor's* network. In this regard, node entry and exit are different in nature from the other four actions. An entry simply creates an ego network where there was none and an exit results in the disappearance of an ego network. Note that the change in structure for the focal actor (the one who undertakes the action) is infinite in the first case and trivial in the second case. While not inconsequential, these two actions bring up very distinct issues that do not fit as well with our goals for the remainder of the paper. In contrast, incumbents firm strategically engage in alliance formation, alliance dissolution, acquisitions, and divestitures that can produce both the expected and unexpected structural changes that are of interest in this study. Hence, for the remainder of this paper, we will focus on those four strategic actions.

Second, because this is the first comprehensive foray linking node- and tie-changing actions to corporate objectives and network structures, our primary goal is to point to interesting possibilities and sketch out potential relationships. It would be impossible to lay out fully specified mechanisms linking each objective to each action for each specific structural outcome in one paper. Indeed, laying out the full set of implications for any single objective-action-

outcome combination requires a separate paper—probably multiple papers (such as Buskens & Van de Rijt, 2008 and Jackson & Wolinsky, 1996 do for tie additions or Hernandez & Menon, 2018 do for node collapses). Hence, at the outset we understand that several important mechanisms will remain unspecified, which subsequent research will need to develop further. Yet we believe that justifying such future work requires that we first lay out the broad parameters of the conceptual space linking corporate strategy to a variety of potential structural outcomes.

CHANGE IN IMMEDIATE NETWORK STRUCTURE

The two-step rationality assumption suggests that there are some ego network positions that can be impacted by the corporate actions of firms as they pursue broader strategic objectives. Three ego-level positions consistently emerge in the literature as valuable for firms: openness, closure, and status. Firms with open networks tend to have exclusive, non-redundant ties and many structural holes (Burt, 1992). Because it facilitates exposure to novel resources and knowledge, openness has been associated with outcomes such as capability development (McEvily & Zaheer, 1999), path-breaking innovation (Balachandran & Hernandez, 2018), and revenue growth (Burt, 2005). Note that these benefits are congruent with “exploration” corporate objectives. In addition, brokers who span structural holes can control the flow of resources across different clusters of the network if there are few other competing brokers (Ryall & Sorenson, 2007). This benefit fits with the “exclusivity” goals of corporate strategy.

In contrast to openness, firms with closed networks tend to have dense overlapping ties. Closed networks, through mechanisms of coordination, trust, and social enforcement, are associated with outcomes such as innovation productivity (Ahuja, 2000), knowledge protection (Hernandez et al., 2015), and profitability (Burt, 2005). This echoes the “exploitation” objectives of corporate strategy. Finally, firms in positions of high status exhibit high network centrality, which has been associated with mechanisms of influence and reputation that help sellers attract buyers in uncertain markets (Podolny, 2005; Stuart, Hoang, & Hybels, 1999). Obviously, this fits with “status” corporate objectives.

We note that the pure mechanics of node- and tie-changing actions (see Table 1) by themselves do not systematically push firms' immediate networks to become more open, closed, or central. Instead, here we make the point that *the corporate objective drives the direction of structural change*. Some actions in firms' corporate strategy toolkits (i.e. acquire, divest, form or end an alliance) are more congruent with firms' goals than others, which in turn pushes networks to become more open, more closed, or more central. Our propositions in this section seek to address the following question: how effective each is action in helping a firm achieve a structural position congruent with its corporate objective? We organize the propositions around the four types of corporate objectives, with Table 3 offering a summary.

*** TABLE 3 HERE ***

Exploration

Consider a firm concerned with exploration objectives, such as pursuing a novel technology or market (Tatarynowicz et al., 2016). This is an additive goal: it requires accessing new resources, and we noted above that openness is the ego network position most commonly associated with exploration.² From a purely structural lens, ego networks can become more open in two ways: the firm can add new structural holes by developing connections to new clusters, or it can eliminate redundant ties. But for purposes of accessing novelty, the first channel of opening the network is the most relevant because new ideas come from new structural holes (Baum, McEvily, & Rowley, 2012; Kumar & Zaheer, 2018). Simply eliminating redundancies enhances brokerage over *old* partners but it is not likely to expose the firm to new knowledge or resources (that mechanism is about exclusivity, as we discuss later). Thus, the question is how instrumental each of the four corporate actions (tie formation, tie deletion, acquisition, divestiture) is in facilitating access to new structural holes.

² It is important here to distinguish exploration from innovation. Exploration is *one* component of innovation, and open networks are particularly suited to exposing firms to novelty in the discovery phase of innovation (Balachandran & Hernandez, 2018; Burt, 2004). Innovation also requires exploitation in the execution and commercialization phases of bringing a product or technology to market (Balachandran, 2018). This is why some studies have shown that closed networks are more strongly associated with firm innovation than open networks (e.g. Ahuja, 2000). We see the execution phase of innovation—and the closed networks suited to it—as part of the broader set of “exploitation” goals firms pursue, which we consider in the next proposition.

Additive node collapses should be the most impactful action to enhance openness. A firm can gain several new structural holes in one transaction by inheriting a target's portfolio of relationships. Inasmuch as the networks of the acquirer and target do not perfectly overlap, the transaction exposes the acquirer to many new partnerships. Because node collapses offer ownership and control over multiple contractual ties, they are likely to have the greatest impact on openness per transaction. An additive node collapse can also be a means of acquiring a dense network, but that would not be congruent with the goals of firms pursuing exploration.

Tie additions also can help a firm increase the openness of its network if they bring new bridging ties. Because firms can only add one tie at a time, the impact of each individual action should be lower compared to a merger. Of course, a firm could piece together a series of tie additions to achieve a desired increase access to novel external resources, in principle producing a change equivalent to that obtained from an acquisition. However, there are a few important constraints with tie additions that deserve attention in comparing their efficacy to node collapses.

First, while the direct cost of establishing an alliance is lower than that of an acquisition (typically), the total direct cost of piecing together multiple alliances is not necessarily lower than the cost of one acquisition. Second, there could be significant transaction costs in searching for and negotiating multiple alliances—and those may exceed the transaction costs of making one acquisition. Third, a focal firm may not be able to persuade all the separate target partners to ally with it. The firm may not be a desirable partner or the potential partners may not be willing or available all at the same time. Fourth, even if the firm could assemble the entire portfolio of new alliance partners, the result may not be an increase in openness comparable to that obtained by acquiring the same set of new partnerships through a node collapse. Suppose firm B has 3 partners that firm A desires. If firm A establishes alliances with those three partners and firm B remains an independent firm with ties to the same three partners, A and B are now competing brokers because A has redundant ties with B. In contrast, if A acquires B, A is now the exclusive 'owner' of those relationships. This gets to the fifth and final consideration: acquisitions offer greater control over the ties obtained from a target relative to tie additions. All else equal,

additive node collapses are likely to have a greater impact on gaining new structural holes than tie additions.

The other two actions, divestitures and tie deletions, are incompatible with exploration because they are subtractive. Divestitures can mechanically lead to increases in openness by severing a dense portion of a firm's ego network and leaving behind a less dense portion. However, a transaction of that nature does not create *new* structural holes for the parent firm, and as we noted earlier old relationships are less likely to expose the firm to novelty than new ties. Plus, divestitures shrink a parent firm's ego network, reducing the number of potential channels of novelty. Similarly, though on a smaller scale, tie deletions do not enhance openness because there is no first-order tie the firm can remove that would create *new* structural holes for itself.

To be clear, we are not assuming here (or in any of the other propositions) that firms fully take all these considerations into account. Rather, these effects arise from firm's goal of "getting something novel" as they try to make sense of the external consequences of their actions, within the bounds of two-step rationality. Hence,

Proposition 1: Corporate actions aimed at exploration objectives will tend to lead to a larger and more open ego network for the focal firm. In this process, additive node collapses are likely to have the strongest effect on network openness, followed by tie additions. Tie deletions and node splits are unlikely to be undertaken for exploration objectives.

Exploitation

Now consider a firm concerned with exploitation, which is relevant in situations that require efficient use, maintenance, and coordination of existing resources (Lin, 2001; Ahuja, 2000). Network closure is the position most commonly associated with these types of goals because it fosters high levels of communication, diffuses common information, functions as a mechanism of social enforcement, and facilitates monitoring (Coleman, 1988). Mechanically, ego networks can become more closed through the opposite of the two channels that lead to openness: establishing new redundant ties or eliminating existing non-redundant ties. The corporate goal of focusing on a core business to use current resources more efficiently is

subtractive, in the sense that non-core resources will be shed. Hence, a firm would pursue actions that prune its network of one or more ties deemed to be outside the core business. Because they are non-core, these ties are more likely to link the firm to sections of the network to which it is weakly and non-densely connected (Hernandez et al., 2015).

*** FIGURE 4 HERE ***

Divestitures are likely to be the most powerful means of accomplishing the goal of focusing, because they give the focal firm latitude to eliminate multiple ties at once. Take the example in Figure 4, where a firm has an ego network in which half of its partners are densely interlinked with one another and the other half are not. Say the second half involves alliances in non-core and unrelated businesses the firm wishes to divest in order to focus on core and related businesses, represented by the dense half of the web. A divestiture would allow the firm to eliminate all the non-redundant links at once, resulting in a more closed network, as illustrated on the right side of the figure. Of course, tie deletions can also be a means of removing undesired relationships. Hence, a relevant question is whether pruning many ties through a divestiture is more effective than doing it via a series of separate tie deletions. The answer depends on the magnitude of the task (how many undesirable ties does the firm have?). It also depends on the relative ease of terminating alliances vs. reassigning their ownership to a new legal entity. But holding these factors constant, divestitures should be the most impactful per transaction.³

Node collapses can mechanically increase closure, particularly when the acquirer inherits a strongly closed ego network from the target. However, this type of additive node collapse is not congruent with the exploitation goal because it brings several *new* relationships and resources to the focal firm. Absorbing, developing trust, and building resource-sharing routines with new alliance partners is disruptive and takes time (Dyer & Singh, 1998). This goes against the

³ We also recognize that not all divestitures lead to more closed ego networks, as the example of eBay and PayPal (Figure 3) illustrated. Indeed, a firm could divest to keep the more open portion of its network. This is where the corporate objective is crucial: closed networks are more congruent with efficiency (coordination, trust, etc.) than open networks, so the goal drives a preference for density. Nevertheless, a divestiture would also be the most effective means of pruning the dense portion of a firm's ego network if that were the firm's desire.

corporate goal of focusing on the efficient use of current resources. We thus do not expect that firms would use acquisitions as means of focus.

Tie additions can allow a firm to close open triads. Here we refer not to closing open triads in which the focal firm is the broker, but those in which another firm is the broker between the focal firm and another node. This may happen, for instance, if the firm and its partner agree to increase coordination with a third party (to which the focal firm was not linked) because of a strategic need to interact more multilaterally and intensely than before. In that case, the tie addition does not add many new partners compared to a node collapse, so its disruptive effects would be relatively minor. Firms might pursue this action for exploitation goals, but in probably in relatively small doses. Thus,

Proposition 2: Corporate actions aimed at exploitation objectives will tend to lead to more closed ego networks for the focal firm. In this process, node splits are likely to have the strongest effect on network closure, followed by tie deletions, and then by tie additions. Node collapses are unlikely to be undertaken for exploitation objectives.

Exclusivity

When firms seek market power, they attempt to enhance exclusivity by controlling the flow of scarce resources in competitive interactions with other players in the market. Firms gain exclusive control of resources through vertical or horizontal integration (Devos et al., 2009). The former is achieved by acquiring suppliers or buyers, and the latter by acquiring rivals. Using input-output tables to map the network of resource flows across sectors of the U.S. economy, Burt (1983) demonstrated that firms tended to make acquisitions in sectors where they were ‘constrained’ from controlling production inputs (i.e. brokered by others). The implications of that work are directly relevant for the notion of subtractive node collapses we discussed earlier. Figure 2b illustrates how acquisitions can help a firm eliminate the redundant ties of a target through node collapse and tie consolidation, which prunes the network and makes the acquirer a more exclusive broker than before. This creates a significant advantage, because the presence of other brokers threatens the ability of a focal broker to extract value from its position (Ryall & Sorenson, 2007). This gets at the oft-mentioned control benefits of structural holes (Burt, 1992).

It is unlikely that other actions can enhance the exclusivity of a firm in controlling the flow of resources in a network. Tie deletions do not help because the ties that would need to be deleted when another node is a competing broker are those of the other node—it would be implausible for a focal broker to convince a rival broker to dissolve its ties. A tie addition might, in principle, allow a firm to secure access to a scarce resource if the partner can be relied upon to not behave opportunistically, but transaction cost considerations suggest this is unlikely (Williamson, 1991).⁴ Finally, a node split is unlikely to be a direct means of increasing exclusivity. Any connections or resources assigned to a newly created firm cannot be legally controlled by the parent anymore. Node splits can mechanically result in more open ego networks for the parent firm (see footnote 3). But the resulting network would be smaller than before, leaving the parent firm in control of fewer resources, which is not congruent with the exclusivity objective. Hence,

Proposition 3: Corporate actions aimed at exclusivity objectives will tend to lead to more openness in the ego network of the focal firm. In this process, subtractive node collapses have the strongest effect on network openness. The other actions are unlikely to be undertaken for exclusivity objectives.

Status

Finally, consider a case where a firm is concerned with status-related goals. Status is particularly valuable under conditions of uncertainty, when quality is hard to ascertain for buyers and sellers use signals that help them become the ‘firm of choice’ in the market (see Sauder, Lynn, & Podolny, 2012 for a review). A firm would thus seek to improve its status in settings where uncertainty is high, such as in nascent or dynamic industries (Baum et al., 2000). In networks, status is manifested in the relative distribution of centrality among nodes, with central actors having more status than peripheral actors. Status is recursive: a function of how many connections a firm has, weighted by the connectedness of those partners, which in turn enhances the status of the focal firm. Status is also relative: it matters if a firm is more or less well

⁴ One could argue that adding a strong tie can be a means of securing access to a scarce resource without needing to resort to an acquisition. That may work in principle, but tie strength is not a feature of network structure (which is the focus of this paper). And the strong tie would need to be effective after accounting for transaction costs.

connected than others in the broader network. While a firm cannot control the number of ties of its partners, the pursuit of market influence can lead it to seek for well-connected partners. This is an additive objective, and thus the actions most likely to impact status would be those that bring new ties. Tie deletions and node splits are unlikely to be effective because they do not increase the size of an ego network.

Given the nature of the objective, additive node collapses should be the most impactful in enhancing a firm's status by bringing multiple new ties in one transaction. The next most impactful action, at least on a per-transaction basis, should be tie additions. As with our earlier discussion on exploration objectives, it could be that multiple additions produce an increase in centrality comparable to a single merger. But due to the same constraints discussed earlier, tie additions should be a less effective means than additive node collapses.

A further consideration, unique to the case of status, is whether mergers or additions are more likely to help the firm connect with partners that are highly prominent. Lower status firms may have a hard time convincing higher status firms to partner with them because they have more to gain than they have to offer. Thus, adding a tie to a well-connected partner is difficult when both actors are concerned with their status. In contrast, acquiring a firm whose partners are well connected may be more plausible if the acquirer offers a high enough price for the target. This is not to say that the 'winning' price will always be worth it, and lower status firms may usually lack the resources to make expensive acquisitions in the first place. However, all else equal, it seems like making a single status-enhancing acquisition is more plausible than orchestrating multiple new tie additions with higher status targets. This notion relies on the expectation that acquisitions are more one-sided than tie additions (see Table 1). Intriguingly, it suggests that acquisitions may offer a path for a few lower status actors to undermine the increasing returns to scale enjoyed by higher status actors (Barabási & Albert, 1999).

Proposition 4: Corporate actions aimed at status objectives will tend to lead to more centrality in the ego network for the focal firm. In this process, node collapses have the strongest effect on network centrality, followed by tie additions. Tie deletions and node splits are unlikely to be undertaken for status objectives.

UNINTENDED CONSEQUENCES

As mentioned, two-step bounded rationality implies that actors cannot control or anticipate the consequences of the corporate actions they undertake beyond their ego networks, and possibly some side effects within their ego networks. When the firm performs an action that changes its immediate network, that action sets off other changes and reactions that ripple throughout the broader network. This is likely to create unintended effects beyond the reach of the two-step vision of the focal actor, some of which may help the focal firm and other network participants and others which may undermine the focal firm and other actors.

In this section, we consider the ripple effects at increasing distance from the focal firm. We begin with the impact on the focal firm's ego network. Because these are within the two-step vision of the firm, such effects may not be unintended but still create side effects or tradeoffs the firm must accept when pursuing a certain goal. We then expand outward to consider the network externalities that ego's actions create for its immediate partners, some positive and others negative. Finally, we zoom out to the global network level and consider the system-wide effects of multiple egos pursuing similar objectives through similar network-changing mechanisms (see Buskens & Van de Rijt, 2008 for a similar idea).

Laying out the various unintended consequences for the focal firm, its alters, and the global network for each of the four corporate actions and all four corporate objectives would be intractable in a single paper. To reduce the dimensionality of the task, we only consider the implications of the single most impactful action (per propositions 1-4) for each of the corporate objectives. Given the multiple agents involved beyond ego networks, our focus is on developing a few logically plausible effects (proof of existence), rather than on proposing general patterns. We hope future research can consider other relationships we do not explore here and use other methods to assess generalizability. We organize this section around the four corporate objectives, as summarized in Table 4.

*** TABLE 4 HERE ***

Exploration

Per proposition 1, additive node collapses are the most effective action for firms pursuing exploration objectives, which results in more open networks. The most obvious side effect for the focal firm is a reduction in network closure—the opposite of openness—and its attendant benefits. This is a tradeoff rather than an unintended consequence. A probable positive side effect of pursuing additive node collapses is an increase in status. The mechanism here is straightforward: inasmuch as the new partners a focal firm adds to its ego network are themselves linked to other nodes, the connectedness of the focal firm increases overall. There are potential cases in which a firm acquires a target that was systematically linked to other nodes with no other ties. Here only the degree centrality of the acquirer increases, but not its connectedness to the broader network, though we see that as a probabilistically unlikely scenario.

More interesting than the consequences for the focal firm are the network externalities that the focal firm's pursuit of additive node collapses creates for the pre-acquisition alters of the acquirer and target. These firms are not directly involved in the transaction, but their structural position is unwittingly altered (see Hernandez & Menon, 2018). A positive externality is that the status of alters increases because the acquirer is now much better connected as a result of its larger ego network. The pre-acquisition partners of both the acquirer and the target experience a positive status spillover by being tied to the much more central acquirer post-acquisition.

Another potential externality causes some of the pre-acquisition partners of the acquirer or target to lose structural holes. This is best illustrated by the change experienced by nodes A1 and B1 in Panel 3 of Figure 1. These nodes were brokers between each other and one of the two nodes involved in the acquisition. The collapse of A and B leads to the loss of that bridging position. This may be positive or negative, depending on the corporate objectives of A1 and B1. The broader pattern is that alters that used to broker between either the acquirer or the target and to another pre-acquisition partner of the acquirer or target experience an increase in closure without choosing that outcome.

*** FIGURE 5 HERE ***

Finally, consider what could happen if multiple network actors pursuing exploration objectives engage in acquisitions that produce additive node collapses, as illustrated in Figure 5 (panel A).⁵ If the rate of acquisitions exceeds the rate of node entry, the network will shrink over time. Moreover, because firms are pursuing deals that create new bridging ties to capitalize upon the benefits of structural holes, the overall network will also become less modular. This is because the exploration objective leads firms to seek for bridging ties across distinct clusters. If multiple firms are doing this, the modularity of the network will inevitably go down. A twin outcome of this is that fewer total structural holes are available. At an aggregate level, this undermines the exploration objectives of individual firms because a small, non-modular network with few unrealized bridging ties creates few opportunities for innovation: there is a low supply of potential partners and a high redundancy of connections. This echoes some of the findings of the well-known simulation of Buskens and Van de Rijt (2008), in which all actors pursue structural holes, but the consequences arise through a different mechanism (node collapse) than the one in that study (tie addition).

Proposition 5: As firms' ego networks become more open in the process of pursuing exploration objectives through additive node collapses, the following consequences can occur:

(a) The ego network of the focal firm becomes less closed and (b) the focal firm's network status increases.

(c) The status of alters previously connected to the acquirer or target increases and (d) the ego networks of alters that brokered between one of the two collapsed nodes and a partner of one of the two collapsed nodes become more closed.

The global network becomes (e) smaller and (f) less modular, with (g) fewer unrealized bridging ties.

⁵ In our consideration of global network effects for all the propositions, we assume that a handful of actors pursue similar actions. We understand that different actors may be following distinct strategies in pursuit of unique advantages, but hold that factor constant to keep the theorizing parsimonious.

Exploitation

Proposition 2 suggested that node splits are most effective when pursuing exploitation-related objectives, which results in more closed ego networks. As before, a mechanical side effect of this for the focal firm is to reduce network openness and its potential benefits—once again an obvious outcome but a tradeoff nonetheless. In addition, pursuing closure by pruning multiple ties will lead to the negative consequence of losing centrality, which in turn probabilistically reduces the status of the firm, unless the divestiture only leads to the loss of extremely poorly connected alters.

Node splits create a negative status externality for the firms that were linked to the parent firm pre-divestiture but get reassigned as partners of the newly created firm post-divestiture. Recall that one of our expectations (see Table 1) is that firms usually divest a minority of their ties. Hence, the newly created firm will usually have lower centrality (and thus status) in the network than the parent firm, and the partners transferred to the new firm will suffer a loss in status for not being linked to the parent anymore (see Figure 4). Of course, this would not be the case if the parent firm maintains ties to the nodes now allied to the newly created firm, but this is unlikely if the divestiture is meant to sever ties to a non-core business.

Node splits can create structural holes for a subset of the alters of the parent firm that were tied to each other pre-divestiture, under two specific conditions: those partners need to maintain the tie post-divestiture, and one of them needs to be “reassigned” to the new firm. This is illustrated in Figure 4, where firm 7 is in a stronger brokerage position compared to its position before the split. Whether this is positive or negative depends on the strategic goals of the firms affected by the externality.

If multiple network participants are pursuing exploitation objectives and engage in divestitures that increase closure, several interesting consequences will happen at the global level as illustrated in Figure 5 (panel B). Predicated on the rate of node exit not exceeding the rate of node creation, the network will grow over time as new nodes spin out from incumbent nodes. At the same time, because the objective is to focus on efficient use of current resources, the overall

structure will become more modular. This occurs because each firm will find more value in belonging to a self-contained cluster but not in connecting too much across clusters (given the exploitation objective). At an aggregate level, this process undermines the number of opportunities for exploitation because there are fewer dense clusters left over time, shifting the environment towards more chances for exploration by bridging across clusters.

Proposition 6: As firms' ego networks become more closed in the process of pursuing exploitation objectives through node splits, the following consequences can occur:

(a) The ego network of the focal firm becomes more open and (b) the focal firm's network status declines.

(c) The pre-divestiture nodes assigned to the new firm lose network status and (d) network openness increases for alters of the parent that were tied to each other pre-divestiture if one of them gets "reassigned" to the newly created firm.

The global network (e) grows and (f) becomes more modular, with (g) with more unrealized bridging ties.

Exclusivity

In the third proposition, we suggested that subtractive node collapses are the most common action undertaken by firms pursuing exclusivity objectives, which results in a more open ego network for the focal firm. Obviously, this creates the tradeoff of losing the benefits of closure. A positive side effect for the focal firm's network is an increase in status, which arises from the *relative* change in the firm's centrality. In the pre-acquisition regime (before a subtractive node collapse), the acquirer and target had similar networks and they were both densely linked to a set of common partners—which is what created the undesirable redundancies to begin with. Hence the acquirer and target had little status advantage over each other and over their common partners. Post-acquisition, the focal firm has fewer status rivals because it is the hub linking many partners less central than itself.

The most obvious negative externality for the acquirer's pre-collapse partners is a significant decline in their brokerage power. They can no longer play the acquirer and target off against each other—the focal firm has turned the tables by becoming the exclusive broker. The

status externalities of the subtractive node collapse depend on how well-connected the alters were (pre-acquisition) to others besides the acquirer and target. Those that had a reasonable number of connections to other firms (say, medium to high centrality) experience an increase in status because the greater connectedness of the acquirer reflects positively in the eyes of their pre-existing partners. In contrast, those with few or no connections other than to the acquirer and target before the deal experience a decline in status because one of their main sources of connectedness has disappeared. For instance, in Figure 2b, the status of nodes 2, 14, and 15 increases because their ‘centrality’ with one another remains post-acquisition; while the status of nodes 12 and 18 decreases because their centrality pre-acquisition depended strongly on being linked to the acquirer and target.

The global network consequences of multiple firms engaging in subtractive node collapses are different from those when firms engage in additive node collapses (exploration). This is illustrated in Figure 5 (panel C). The pursuit of acquisitions by multiple firms leads to network shrinkage (again, as long as the rate of entry does not outpace the rate of collapses). However, the network becomes *more* modular as a whole because firms are seeking openness to have greater control, which results in islands of relatively disconnected open networks. However, because of the few realized ties across ego networks, there are abundant opportunities to generate bridging ties. These changes in the global network are congruent with the individual exclusivity objectives of the focal firm (unlike in the cases of exploration and exploitation, where the changes went against the initial goals of the focal actors). As a side effect, the total network offers more opportunities for exploration (due to unrealized bridging ties) but fewer chances for exploitation (due to the lack of closure within clusters).

Proposition 7: As firms’ ego networks become more open in the process of pursuing exclusivity objectives through subtractive node collapses, the following consequences can occur:

(a) The ego network of the focal firm becomes less closed and (b) the focal firm’s network status increases.

(c) The pre-acquisition partners of the focal firm lose brokerage power and (d) status declines for alters with few or no links other than to the acquirer or target but increases for alters with medium to high links to partners other than the acquirer or target.

The global network (e) shrinks and (f) becomes more modular, with (g) with more unrealized bridging ties.

Status

Proposition 4 suggested that, in the pursuit of status-related goals, firms would be most likely to engage in additive node collapses resulting in higher centrality. Because an increase in centrality may lead to either more open or more closed networks, and firms do not pursue either, we cannot predict whether status-enhancing node collapses increase openness or closure. This is not symmetric with the scenario in which firms pursue exploration (which had the positive side effect of increasing the firm's network status) because the pursuit of status does not bring an attendant increase in openness. An increase in status for the focal firm creates positive status externalities for its pre-acquisition partners. Because the status of the acquirer increased significantly compared to before (the acquirer inherits several new ties), the alters are now connected to a much more high-status firm than before.

The global network consequences in this scenario are distinct from those in the other three, as depicted in Figure 5 (panel D). As with all scenarios in which many firms engage in acquisitions, *ceteris paribus* the global network will tend to shrink over time. Because many actors are pursuing status advantages, over time the network evolves into a differentiated core-periphery structure. Here, a few 'oligopolist' nodes that have been able to pursue centrality-enhancing acquisitions will end up with very high-status positions. This happens because acquirers who can afford it pursue targets that are already highly central—which bring many new, status-enhancing links. At the same time, acquirers are not motivated to pursue low-centrality nodes that do not meaningfully enhance their status. These unacquired, low centrality nodes remain at the periphery of the network (assuming very low-status firms lack the resources and influence to acquire very high-status firms). Hence there is low differentiation in status

among the few nodes with large ego networks, but large status differentiation between those nodes and the peripheral ones.

Proposition 8: As firms' increase their network status in the process of pursuing exclusivity objectives through subtractive node collapses, the following consequences can occur:

(a) It is indeterminate whether the ego network of the focal firm increases in closure or in openness.

(b) The status of alters previously connected to the acquirer or target increases.

The global network (c) shrinks and becomes defined by a core-periphery structure, with (d) a small set of firms with very large ego networks, and (e) many peripheral nodes with small ego networks.

DISCUSSION

We now consider several implications of accounting for node-driven network change and some new concepts suggested by the propositions. One important idea is that there is significant heterogeneity in the mapping of corporate actions to structural outcomes—so it is not trivial whether networks change through tie- vs. node-altering mechanisms, or even through different tie-changing or different node-changing means. The various actions differ in the magnitude by which they lead to change for the same network position (e.g. node splits are more powerful than tie deletions to increase closure). And different actions are most conducive to distinct positions (e.g. subtractive node collapses for exclusivity goals, additive node collapses for status goals). Further, despite receiving the most research attention, additions and deletions are usually not the most influential (per transaction) in producing network change. We have not made predictions about frequency, so it may be that tie changes are more frequent but less impactful, and vice versa for node changes. We suspect frequency differs across contexts, according to the costs and benefits of each type of transaction (Capron & Mitchell, 2012 offer good guidance on that issue).

The notion of network externalities—the structural change that a focal firm's action creates for other network participants not directly involved in the transaction—merits further development. Propositions 5-8 speculate about some of those externalities, but the idea is

intriguing apart from any specific hypotheses. Externalities introduce the possibility that the structural position of another firm could be exogenously modified. The acquisitions, divestitures, or exit of a *third party* may positively or negatively change the position of an organization. If nothing else, this suggests a way to empirically test causal network effects if the actions of third parties are viewed as exogenous (e.g. Azoulay, Graff Zivin, & Wang, 2010 use the death of network collaborators as an empirical strategy). But this is even more interesting theoretically: do firms become aware of these exogenous changes and how do they respond to them? How do they rebuild their networks after these types of events? Some of these issues have been studied in natural or electronic networks (Callaway, Newman, Strogatz, & Watts, 2000), but not in interorganizational webs where each node's behavior is driven by a corporate goal.

Another fascinating implication is that there may be a discrepancy between the manifestation of corporate objectives at the ego vs. global network levels. For instance, the pursuit of exploration objectives through acquisitions by multiple firms, which produced open ego networks for acquirers, can undermine aggregate opportunities for exploration by leading the global network to become smaller, less modular, and with few bridging tie opportunities (Propositions 1 and 5). We observed similar patterns for firms pursuing exploitation (Propositions 2 and 6) and status (Propositions 4 and 8) objectives. These discrepancies stem from two factors: the bounded network rationality of firms (i.e. "two-step" rationality) and the complexity of global networks. Put succinctly, it is simply impossible for a focal firm to play out all the ripple effects of its actions in the network—especially as actions compound at the global level. We believe that simulations and empirical studies can play out the global effects of local network actions more rigorously than verbal theorizing has allowed us to in this study.

The local vs. global network effects raise an important issue for the corporate strategy literature: what role do external networks play in spreading the consequences of corporate actions? One can imagine that the global structure of an interfirm network can amplify or constrain the actions of individual firms. For instance, the network may facilitate or hinder an acquirer seeking market power from achieving that objective. Further, networks may accelerate

or slow down the reactions of others to a focal firm's action. Continuing the example of a focal firm pursuing market power, it is conceivable that the connectedness of the global network may quickly spread the effects of that firm's acquisition in ways that lead other firms to respond with acquisitions of their own, kicking off a merger wave. This seems to play out in certain industries (e.g. airlines and pharmaceuticals) where merger waves happen periodically and where the value of external relationships is important and measurable. Hence, while we typically think of the antecedents and consequences of corporate actions like M&A or divestitures as driven only by strategies of the nodes, it could be that the network surrounding the nodes plays an important part as well. And that role may be particularly interesting where network effects are not salient to individual firms.

An issue we have not tackled in this paper, but worth considering, is how different actions are bundled or sequenced as firms pursue overarching goals. As mentioned in earlier, some actions are subtractive (deletions, splits, collapses) and others are additive (additions, collapses) and a firm could use a mix of both types to reach its objectives. For example, consider a firm in a mature industry that experiences a technological shock requiring an upgrade or change in capabilities, and that those new capabilities in part need to be obtained through external networks. This creates the need to become more innovative in a new domain, making network openness more important than before. A first step would be a divestiture to get rid of a legacy business and all its associated alliances at once (Feldman, 2016). This pruning action creates room for new partnerships that create structural holes, which the firm can graft in through a mix of node collapses and tie additions to create a portfolio of novel capabilities. Corporate strategy research already tells us that firms use sequences of actions over time. The key point is that we have overlooked that these actions are valuable not only to renew portfolios of internal resources but also to reposition the firm's network accordingly.

A further variation of this implication is that the objectives firms pursue may change throughout the industry life cycle—with network opportunities being an important driver of inflection points in the cycle. For instance, in the nascent stages of an industry, when uncertainty

is high and technological or business model innovation is needed, one would expect corporate objectives such as status and exploration to be important. Status helps firms accrue resources under conditions of uncertainty, and openness exposes firms to novel ideas. As the industry matures and business models stabilize, uncertainty reduction and innovation become less important. Now the locus of value shifts towards activities in which efficiency and exclusivity are more important, leading to closure within clusters and control across clusters. If this were the case, firms might use different bundles of actions to shape their networks throughout industry life cycles. But crucially, the global network changes discussed in Propositions 5-8 may themselves create the need for these shifts to begin with. For instance, when the network becomes small, non-modular, and with few exploration opportunities as a result of many actors pursuing exploration (Proposition 5e-5g), it pushes firms towards exploitation goals achieved through pruning actions (divestitures, tie deletions) until the network becomes large, modular, and with many unrealized bridging ties (Propositions 6e-6g). The dynamics then oscillate back towards exploration motives, and so on. Hence, viewing networks from a corporate strategy lens may help better explain industry dynamics (Helfat & Peteraf, 2003).

Taking node-changing actions seriously also should affect how network data is gathered and coded. Existing studies typically do not explain how mergers, divestitures, entries, and exits are accounted for in network data. For instance, a common practice when using alliance data is to ‘throw out’ firms that have been acquired along with all their relationships—in essence, they are treated as a node exit. But if the acquirer inherits at least a portion of the target’s pre-merger ties, the transaction modifies the network dramatically. The practice of eliminating acquired targets from network data could thus bias empirical results. Of course, knowing which ties are kept versus lost as a result of a merger is difficult due to non-reporting of how mergers affect alliances. However, scholars should at a minimum consider whether empirical studies are robust to accounting for varying the proportion of the ties an acquirer inherits. Similar precautions should be taken when firms engage in divestitures, in terms of the proportion of ties a firm loses.

Dealing with entries and exits is more straightforward because they are more directly reflected in original network data sources.

In the interest of parsimony, we have held many factors constant in developing the propositions. Invoking variation in those factors offers opportunities for future work. The attributes of ties may be worth considering; for instance, strong ties may make tie additions more valuable than other actions, or firms may pursue multiple actions to connect with the same target firm to create tie multiplexity. A profound issue we did not address is that corporate actions—particularly acquisitions and divestitures—alter the very nature of nodes. For instance, an acquisition brings new personnel and complexity into the organization, while a divestiture sheds valuable human capital but simplifies the organizational structure of the firm. These internal changes surely affect the ability of firms to participate in and benefit from external networks. Also, we have focused on the consequences of corporate actions for the structure of interfirm networks. It would be interesting to study the relationship in the opposite direction: how the network structure affects the choices firms make about various tie- and node-changing actions.

Our objective was to take an initial step towards integrating the literatures on corporate strategy and interfirm networks. We believe the exercise has made several important issues apparent. Foremost is that node change should be a central concept in our understanding of how interfirm networks change. Adding node change mechanisms to the oft-studied tie change mechanisms greatly expands the theoretical and empirical questions scholars can address to understand structural evolution. Moreover, viewing the six network change mechanisms through the lens of corporate strategy offers the possibility of explaining how the pursuit of strategic corporate goals plays out in networks—with the latter being both an object and a channel through which those goals are manifested. We have attempted to sketch out some interesting relationships, but we recognize that many of the detailed theoretical mechanisms remain open ended. We see this initial foray into the topic as an attempt to “plant flags” where a handful of promising ideas and relationships may lie. Future research is required to more rigorously conceptualize and empirically test specific relationships.

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Figure 1
Node and Tie Changing Actions

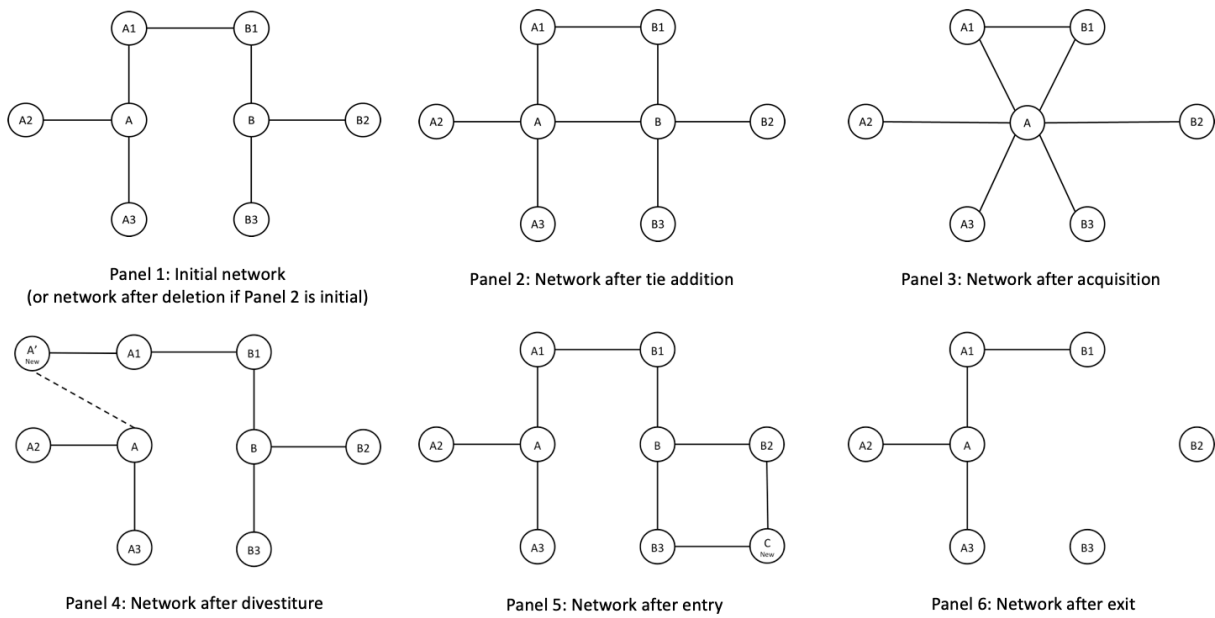


Figure 2a
Additive Node Collapse: Hyseq Acquires Variagenics

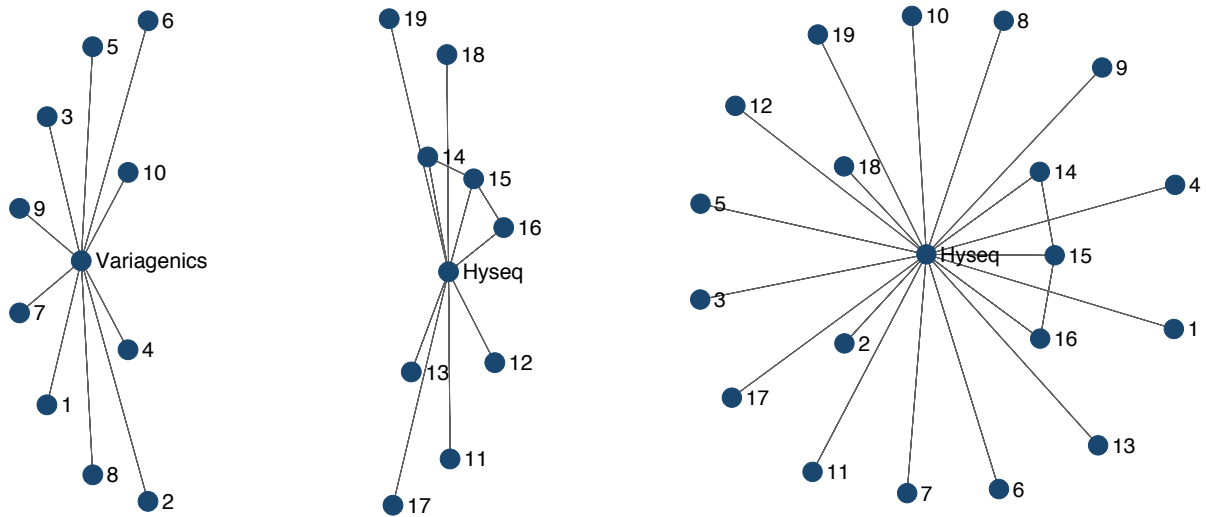


Figure 2b
Subtractive Node Collapse: Solexa Acquires Lynx

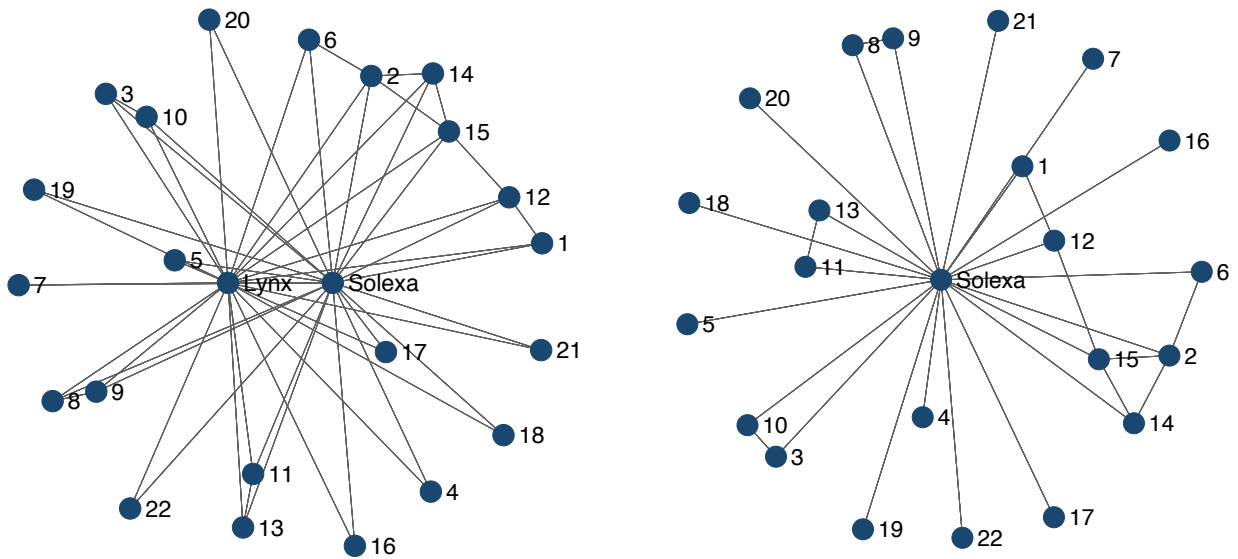


Figure 3
Node Split: eBay Divests PayPal

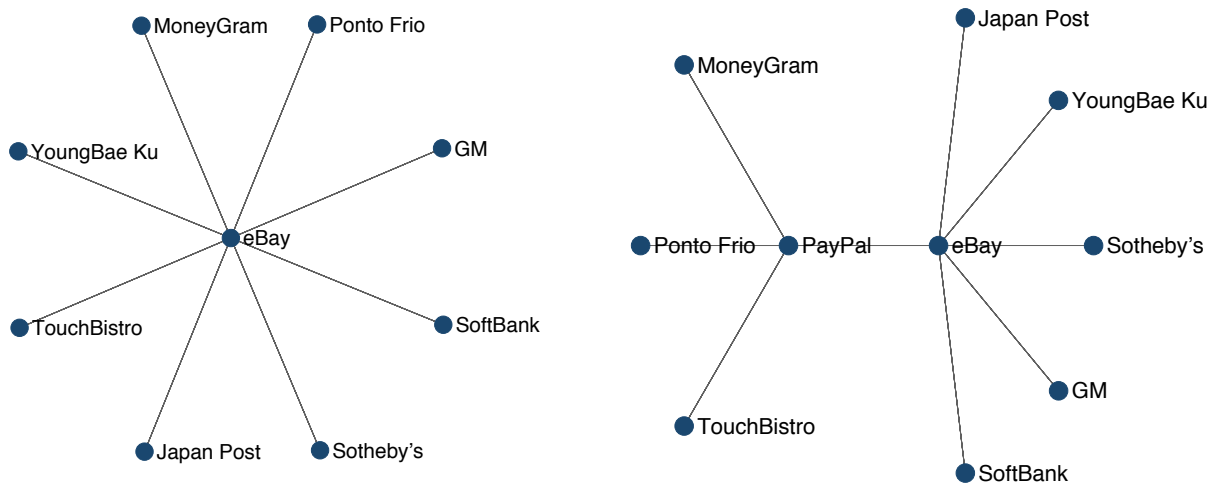


Figure 4
Node Split Driven by Exploitation Objective
(Parent Firm Closure Increases)

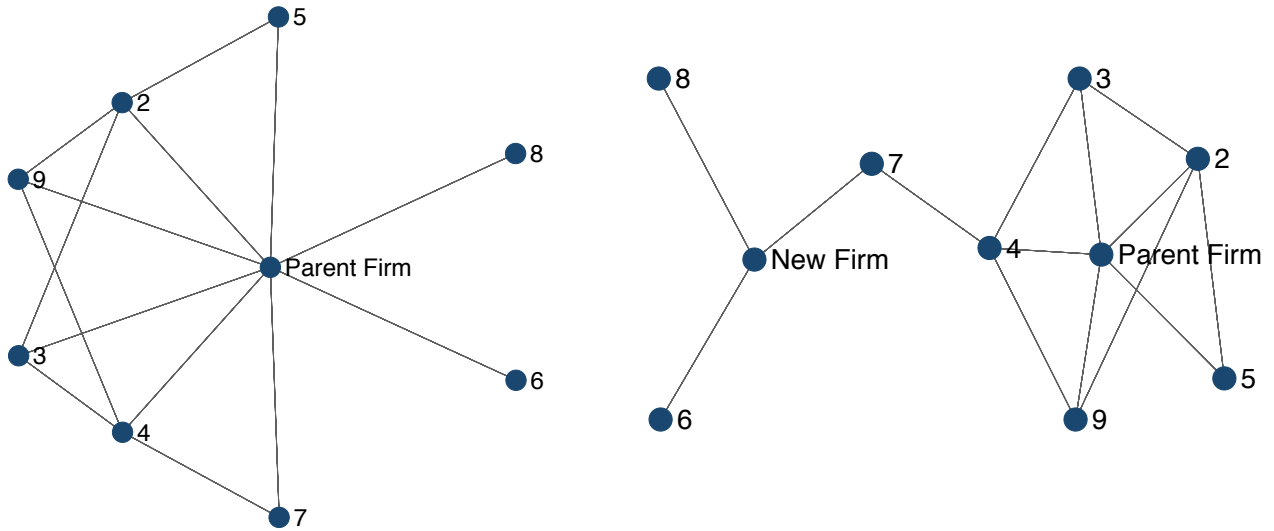
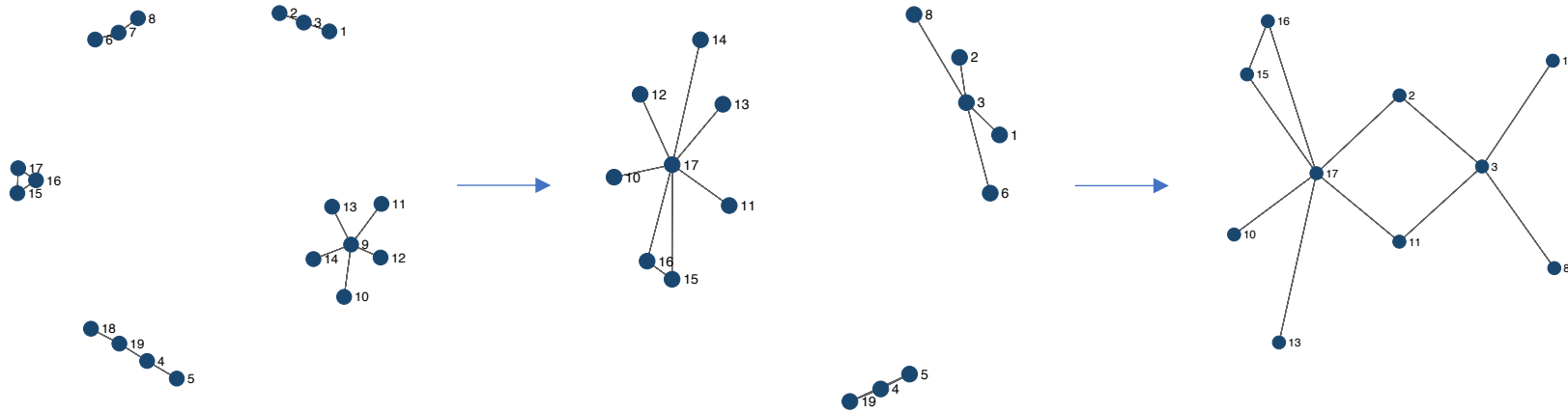


Figure 5

NOTE: See Table 4 and the text for an explanation of these patterns. Not based on real data, for illustrative purposes only.

Panel A: Global network consequences when firms pursue exploration (openness via additive node collapses)



Panel B: Global network consequences when firms pursue exploitation (closure via node splits)

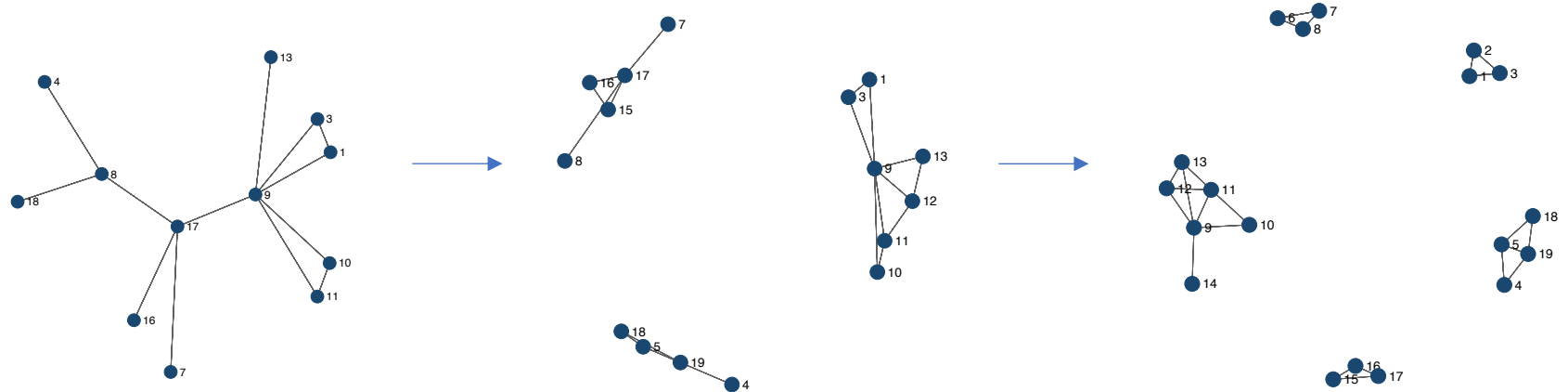
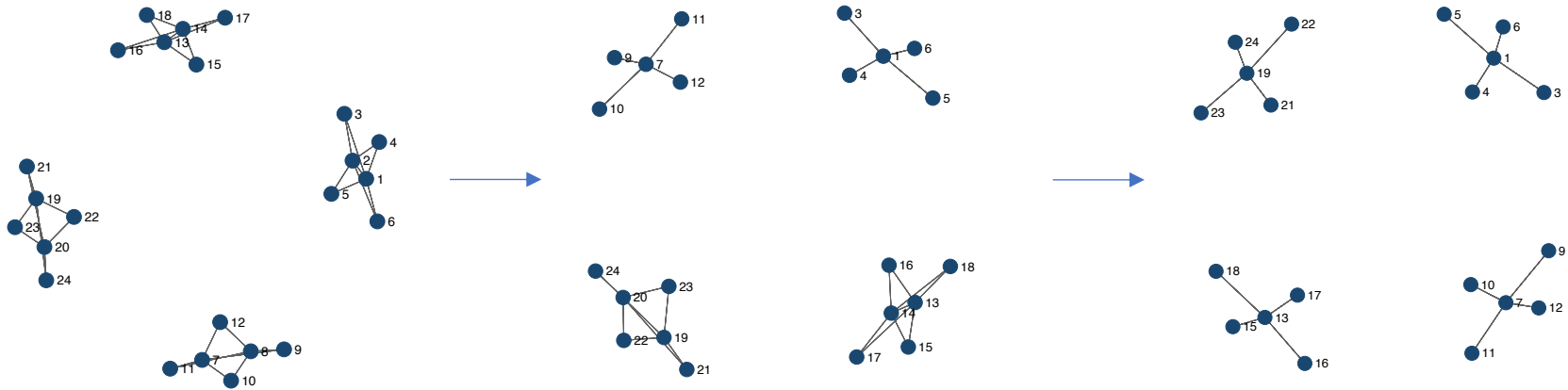


Figure 5 (Continued)

Panel C: Global network consequences when firms pursue exclusivity (openness via subtractive node collapses)



Panel D: Global network consequences when firms pursue status (centrality via additive node collapses)

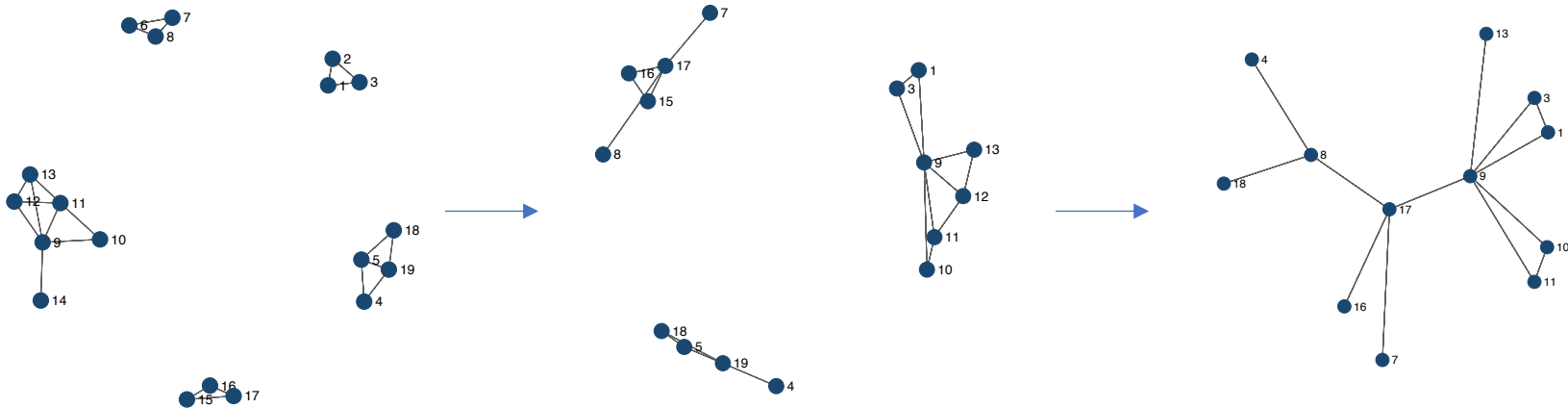


Table 1
Network-Changing Properties of Corporate Actions (Mechanics and Assumptions)

	Tie Addition (e.g. alliance formation)	Tie Deletion (e.g. alliance termination)	Node Collapse (e.g. acquisition)	Node Split (e.g. divestiture)	Node Entry (e.g. new firm, diversifying entry)	Node Exit (e.g. bankruptcy, strategic exit)
Definition	Two existing, independent nodes form a tie	Two existing, independent nodes terminate a tie	A node (acquirer) combines with another node (target) and gains ownership of a fraction of its ties	A node (parent) creates a new independent node to which it transfers ownership of a fraction of its ties	A new node enters the network	A node ceases to exist, along with all of its ties
Actors affected	Ego and alter primarily	Ego and alter primarily	Acquirer and network neighbors of acquirer and target	Parent, new node, and network neighbors of the two	Entrant and network neighbors of ego, primarily	Network neighbors of exiting node
Additive or subtractive?	Additive	Subtractive	Both	Subtractive	Additive	Subtractive
Ownership transfer?	No	No	Yes	Yes	No	No
Effect Size	Small for focal actors, minimal externalities	Small for focal actors, minimal externalities	Potentially large	Potentially large	Small to medium in most cases	Potentially large (externality only)
Consent to perform action	Strongly two-sided	Moderately one-sided (given cost)	Moderately one-sided (given price)	Strongly one-sided	n/a	n/a
Assumptions or clarifications relevant to corporate strategy	Most new alliances are formed independently of other alliances (focused on a narrow objective). Thus, a single tie addition does not materially affect other individual ties	Most new alliances are terminated independently of other alliances (focused on a narrow objective). Thus, a single tie deletion does not materially affect other individual ties	Ego keeps majority of its pre-acquisition ties Additive deal: Ego keeps majority of target's ties (ties are valuable, proper due diligence, post-merger integration) Subtractive deal: Ego consolidates redundant ties (proper due diligence)	The parent firm seeks to disassociate itself from the divested business, including external agreements Most divestitures represent a minority of the parent business. Hence, a minority of the parent's pre-existing ties are legally transferred to the new node	De novo entrants, due to resource and status constraints, have fewer ties to incumbents upon entry than de alio entrants An entrant may have no ties to incumbents upon entry, producing no structural changes in the network	Exit differs from change of ownership. Only the former is directly relevant to structural network change.

Table 2
Studies Linking Corporate Actions to Network Structure

NOTE: This applies to the literature on interorganizational networks. Some work on other types of networks has considered node entry and exit (e.g. Callaway et al. 2000)

Action	Network Openness or Closure	Network Status
Tie Addition	Several published studies, such as: (Buskens & Van de Rijt, 2008) (Zaheer & Soda, 2009) (Shipilov & Li, 2012) (Sytch & Tatarynowicz, 2014)	See Sauder et al., (2012) for a review
Tie Deletion	(Hernandez et al., 2015)	No published study identified
Merger	(Hernandez & Menon, 2018) (Hernandez & Shaver, 2018)	(Hernandez & Menon, 2018) (Hernandez & Shaver, 2018)
Divestiture	No published study identified	No published study identified
Entry	No published study identified	No published study identified
Exit	No published study identified	No published study identified

Table 3
Effects on Immediate Network of the Focal Firm, Given Corporate Objective (Propositions 1-4)

Corporate Objective	Structure Congruent with Corporate Objective	Rank of Impactful Actions	Actions Unlikely to be Effective
Exploration (greater access to novelty)	Openness (new structural holes)	<ol style="list-style-type: none"> 1. Additive node collapse (potential for multiple new structural holes in one transaction) 2. Tie addition (potential to create one new structural hole per transaction) 	<p>Tie deletion (no new structural holes)</p> <p>Node split (no new structural holes, network shrinks)</p>
Exploitation (focus on core business, more efficient use of existing resources)	Closure (coordination, trust, avoid too many new ties)	<ol style="list-style-type: none"> 1. Node split (remove multiple “non-core” ties in one transaction, focus on denser portion of network within which coordination & trust foster efficiency) 2. Tie deletion (remove individual “non-core” ties) 3. Tie addition (closed triads in which focal firm is being brokered by a third party) 	Node collapse (while it may bring a <i>new</i> closed network, this goes against corporate goal of focusing and using existing resources more efficiently; new resources need to be absorbed and new partnerships can be disruptive)
Exclusivity (market power)	Openness (control existing structural holes)	<ol style="list-style-type: none"> 1. Subtractive node collapse (makes focal firm a more exclusive broker by consolidating pre-acquisition redundant ties of a rival broker, provides ownership and control) 	<p>Tie addition (no ownership or control)</p> <p>Tie deletion (deleting focal firm’s ties does not enhance control, and deleting other firms’ ties is unrealistic)</p> <p>Node split (may increase openness, but ego network shrinks and thus fewer resources under control)</p>
Status (become seller of choice for buyers)	Centrality (connect to the well-connected)	<ol style="list-style-type: none"> 1. Additive node collapse (potential for multiple new ties to well-connected alters in one transaction) 2. Tie addition (potential to bring one new tie to a well-connected alter) 	<p>Tie deletion (no new ties)</p> <p>Node split (no new ties)</p>

Table 4
Unintended Network Effects of Firms Pursuing Corporate Objectives (Propositions 5-8)

Corporate Objective	Most Impactful Action (from Table 3)	Side Effects or Tradeoffs for Focal Firm (given it pursues the most impactful action)	Network Externality for Focal Firm's Immediate Partners (given focal firm pursuing the most impactful action)	Unintended Effect for Global Network (if many actors pursue the most impactful action)
Exploration	Additive node collapse	Network closure declines Status increases	Status increases Network becomes more closed for alters that brokered between the acquirer or target and one of their (acquirer or target's) pre-acquisition partners	The global network (1) shrinks and (2) becomes less modular, with (3) fewer bridging tie opportunities
Exploitation	Node split	Network openness declines Status declines	The pre-divestiture nodes assigned to the new firm are likely to lose status Network openness increases when alters of the parent were tied to each other pre-divestiture and one of them gets "reassigned" to the newly created firm	The global network (1) grows and (2) becomes more modular, with (3) more bridging tie opportunities
Exclusivity	Subtractive node collapse	Network closure declines Status increases	Alters lose brokerage power over the focal firm Status declines for alters that with no (or few) partners besides the acquirer and target, and increases for alters with medium to high partners besides the acquirer and target	The global network (1) shrinks, (2) becomes more modular, with (3) more bridging ties opportunities
Status	Additive node collapse	Network openness or closure could increase (indeterminate). This is not symmetric with the increase in status when firms pursue exploration	Status increases	The global network (1) shrinks, and exhibits a core-periphery structure with (2) a small set of firms with very large ego networks and (3) many peripheral nodes with small ego networks