

# CATALYZING STRATEGIES AND EFFICIENT TIE FORMATION: HOW ENTREPRENEURIAL FIRMS OBTAIN INVESTMENT TIES

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Although network ties are crucial for firm performance, the strategies by which executives actually form ties are relatively unexplored. In this study, we introduce a new construct, *tie formation efficiency*, and clarify its importance for superior network outcomes. Building on fieldwork in nine Internet security ventures seeking investment ties, we unexpectedly identify two “equifinal” paths for *how* executives form ties efficiently. One relies on existing strong direct ties and is only available to privileged firms. The other relies on a second new concept, *catalyzing strategies*, a means by which executives advantageously shape opportunities and inducements to form ties that is available to many firms. Overall, we add insights to the network and signaling literatures and to the nascent literature on how strategic action, especially by low-power actors such as entrepreneurs, shapes critical network outcomes.

Network ties are often critical to firm performance. At the level of individual ties, the right partners may improve firm performance by providing valuable resources, information, and status (Davis & Eisenhardt, 2011; Ketchen, Ireland, & Snow, 2007). At the portfolio level, firms benefit from having many ties, partners that complement one another, and a mix of strong and weak ties (Baum, Calabrese, & Silverman, 2000; Ozcan & Eisenhardt, 2009). At the network level, central positions provide broader information and greater status, and positions rich in “closure” (dense interconnections among partners) enhance

trust (Powell, Koput, & Smith-Doerr, 1996; Shipilov & Li, 2008). Overall, research at tie, portfolio, and network levels all suggest that firm performance is higher when firms have many network ties of varied strength with the right partners.

A key implication of this research is that *tie formation efficiency* is likely to be beneficial for achieving superior network outcomes and firm performance. An attempt to gain interorganizational relationships that (1) results in a completed tie, (2) is secured with relatively little time and effort, and (3) yields ties with desired partners has tie formation efficiency. When firms form ties efficiently, they avoid lengthy and high-effort searches, failed attempts, and undesirable partners. As a consequence, compared to firms that form ties inefficiently, these firms are likely to form more ties given the same time and effort, and they are likely to gain faster access to better resources from those ties. In contrast, inefficient tie formation is likely to result in wasted effort, reduced benefits, and delayed access to resources (Baum et al., 2000; Graebner & Eisenhardt, 2004). Overall, tie formation efficiency is likely to be essential for firms seeking superior network outcomes and firm performance.

Yet although efficient tie formation is likely to be important, it is unclear how firms form ties efficiently. Rather, the literature offers a descriptive account of which ties form. The resource dependence theory argument is that firms with interdependent resource needs are likely to form ties (Gu-

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lati, 1995; Katila, Rosenberger, & Eisenhardt, 2008). The social network theory argument is that firms that leverage their direct and indirect ties (Gulati, 1995; Hsu, 2007) or have information signals of quality (Ahuja, 2000; Dushnitsky, 2010; Eisenhardt & Schoonhoven, 1996) are likely to form ties. Together, these theories offer a deterministic account of tie formation in which firms with attractive resources, direct and indirect ties, and high quality are especially able to form ties. But this “rich-get-richer” account does not directly address the process or outcome of efficient tie formation, including failed attempts, speed of formation, and effort expended to form ties. It also neglects the fact that firms often face rivalry for ties. It leaves especially unclear how well-endowed firms efficiently gain ties outside their local networks and how less well-endowed firms form ties at all.

In contrast, an emerging stream of research takes a strategic view of tie formation (Santos & Eisenhardt, 2009; Vissa, 2010). This work emphasizes how firms and individuals actively shape their approach to tie formation through thoughtful agency (Emirbayer & Goodwin, 1994). Some research has shown that symbolic management strategies are likely to improve the success of tie formation attempts (Zott & Huy, 2007). Related research has shown that successful strategies for tie formation are contingent on focal firm characteristics such as executive background (Hallen, 2008). But although strategic action is likely to be germane to efficient tie formation, research has yet to address tie formation efficiency and clarify the range of relevant strategies.

Taken together, previous research studies (1) show that firms gain performance benefits from numerous ties with desirable partners, (2) provide a descriptive account of which ties are likely to form, and (3) suggest a role for agency and strategic action. But the literature lacks an in-depth account of *how* firms form ties efficiently. Our study addresses this gap. We ask, *How do firms efficiently form interorganizational ties?* Given limited theory and evidence, in this research we used multiple-case theory building (Eisenhardt, 1989). Relying on detailed fieldwork, we tracked how executives in a cohort of nine internet security ventures formed new investment ties over their initial five years. By studying variation in tie formation efficiency within- and across firms in a cohort, we offer an unusually revealing comparison of rival strategies for forming ties.

Our study contributes to interorganizational network theory and the resource acquisition strategies of entrepreneurs. First, we introduce the new concept of tie formation efficiency and highlight its importance for creating superior ties, portfolios, and networks. Although tie formation is relevant,

our central insight is that efficiency is a more precise conceptualization of the source of superior network outcomes. Simply put, without efficiency, it is difficult to achieve superior network outcomes. Second, we contribute a theoretical framework that unexpectedly describes two (not one) “equifinal” paths for how firms efficiently form ties (equifinal paths are those that are distinct but produce the same focal outcome). One path relies on strong direct ties and is available to privileged firms. The other path relies on catalyzing strategies and is available to many firms. *Catalyzing strategies*, a second concept introduced here, are either network actions that advantageously shape tie opportunities or signaling actions that amplify the inducements of potential partners. Catalyzing strategies are significant because they broaden access to superior network outcomes, offering such outcomes to many firms, not just the privileged few. Third, we add to the social network and information signaling literatures by sketching their complementarity and temporal interdependence. Finally, we identify scope conditions, noting that catalyzing strategies are most germane for firms of intermediate quality and embeddedness, most important for distant and “heterophilous” ties, and most necessary when firms are mismatched with potential partners who are willing to delay. Overall, we add to the nascent literature on how strategic action, especially by low-power actors such as entrepreneurs, can shape critical network outcomes.

## THEORETICAL BACKGROUND

Our research question asks how firms efficiently form interorganizational tie. By “efficiently form,” we mean that these firms achieve adequate outcomes expending less time and effort than what might be expended to achieve similar outcomes.<sup>1</sup> Thus, efficiency relates to a favorable ratio of outputs to inputs. Tie formation is most efficient when it requires little time and effort and yields a desirable partner. It is moderately efficient when these conditions are partially met (e.g., fast and low effort, but a less desirable partner; high time and effort, but a very desirable partner). It is least efficient when there is no outcome (e.g., failed tie formation) or an inadequate outcome (e.g., undesirable partner) after much time and effort have been expended.

Tie formation efficiency is important because it enhances the likelihood of superior network out-

<sup>1</sup> The efficiency of a tie formation *process* is distinct from the efficiency of a network *structure* for information flow (Burt, 1992; Watts & Strogatz, 1998). We appreciate an anonymous reviewer’s advice to clarify this point.

comes. Forming ties with less time and effort and few failures enables firms to add more new ties with the same time and effort and to gain the benefits of those ties sooner. Having more ties also creates a positive feedback loop that gives firms a more complete network of ties that can be further leveraged into new ties (Gulati & Gargiulo, 1999). Adding ties faster also propels firms to a central network position and so aids future tie formation and performance (Ozcan & Eisenhardt, 2009; Powell et al., 1996). Forming ties with desirable partners accelerates these favorable dynamics. Of course, at a certain point, adding more ties may not be optimal. But even then, efficient tie formation expedites the replacement of ties, and so development of better network portfolios (Powell et al., 1996; Shipilov & Li, 2008). Finally, adding ties with less effort enables executives to devote more energy to managing other aspects of their firms.

By contrast, forming ties slowly with less desirable partners expending high effort, and suffering numerous failures wastes time and effort. Occasional failures may be instructive (Sitkin, 1992), but many failures are stigmatizing (Jensen, 2006) and demoralizing, and they inhibit learning through defensiveness and ineffective attribution (Bingham & Haleblan, 2012). Although a slow process can mean careful vetting of potential partners, it often means that potential partners are duplicitously “stringing along” a firm (Graebner, 2009; Santos & Eisenhardt, 2009). Additionally, a slow process with high effort limits the number of ties that can be formed, and so it is likely to stall firms at the network periphery. A slow process also delays access to needed resources (Baum et al., 2000; Graebner & Eisenhardt, 2004) and allows rivals to capture the best partners first (Ozcan & Eisenhardt, 2009). Moreover, “settling” for less desirable partners is less efficient because such ties usually yield poorer resources and fewer network benefits. Finally, even when a firm has resources and an attractive network position that lessen the value of speed, extensive effort to form ties is still distracting and expensive. Overall, tie formation efficiency is important because it is likely to improve ties, portfolios, and network positions and to generally enhance firm performance.

Although tie formation efficiency is important, it is unclear how firms efficiently gain new ties. Resource dependence theory emphasizes inducements to form ties and implies that firms are more likely to form ties when they have interdependent resource needs (Casciaro & Piskorski, 2005; Gulati & Sytch, 2007; Katila et al., 2008). Thus, it seems likely that firms with many and attractive resources are more able to form ties efficiently than less well

endowed firms. But although suggestive, resource dependence does not directly address how ties form or, specifically, how they form efficiently in terms of the time and effort required. Also, this theory neglects the point that tie formation efficiency may be challenging for even well-endowed firms if desired partners are not compelled to form ties quickly, demand high effort, or have many potential partners. In other words, many and attractive resources may not be sufficient to ensure tie formation efficiency. Finally, the theory leaves open how less well endowed firms form ties at all.

Social network theory emphasizes opportunities for tie formation and implies that direct and indirect ties provide information about tie opportunities and reduce uncertainty about the quality of potential partners (Gulati, 1995; Rider, 2011; Stuart, 1998). Similarly, the theory implies that strong information signals of quality also reduce uncertainty about the quality of potential partners (Ahuja, 2000; Dushnitsky, 2010; Hallen, 2008). So well-connected firms or those with strong signals of quality (e.g., successful executives, impressive firm accomplishments) seem likely to form ties efficiently. But the theory does not directly address how ties form or, specifically, how they form efficiently in terms of effort and failures. Moreover, even well-connected firms may be challenged to form ties efficiently when they seek distant partners or when other well-connected firms are vying for the same potential partners (Baum, Rowley, Shipilov, & Chuang, 2005; Ozcan & Eisenhardt, 2009). Thus, social embeddedness and information signals of quality may be insufficient for efficient tie formation. Finally, it is again unclear how less connected firms form ties at all.

Recent research on strategic action and network agency suggests that executives can purposively break away from the constraints of network structures to form advantageous ties (Chen, Yao, & Kotha, 2009; Santos & Eisenhardt, 2009). For example, Zott and Huy (2007) examined symbolic management strategies for tie formation. They found that entrepreneurs who use symbols conveying personal quality (e.g., high-status MBAs) and firm quality (e.g., prestigious locations) more successfully gain resource relationships with customers and investors. Similarly, Ozcan and Eisenhardt (2009) examined the network strategies of entrepreneurs seeking ties with “complementers.” They found that entrepreneurs who attempt multiple ties at once are particularly successful. Vissa (2010) found that Indian software entrepreneurs who rely on a strategy of leveraging direct (but not indirect) ties tend to form more ties. Complementing this research on strategies, Hallen (2008) examined how firm-level contingencies influence successful strate-

gies for tie formation. He found that well-connected entrepreneurs should seek ties early on, but less well connected ones should wait until they gain accomplishments. Together, these studies indicate that specific strategies such as symbolic management enhance the likelihood of tie formation. But this work does not directly address how ties form efficiently, or whether various strategies to achieve efficiency may complement or substitute one another.

Overall, the literature suggests: (1) firms are more likely to form ties when they have more resources, (2) firms are more likely to form ties when they have social connections and signals of quality, and (3) strategic actions such as symbolic management improve the likely success of tie formation attempts. But the literature does not address efficiency. Thus, despite the importance of efficiency, a granular account of *how* firms efficiently form interorganizational ties is lacking.

## METHODS

Given limited theory and evidence for how firms efficiently form ties, we used inductive theory building with embedded multiple cases (Eisenhardt, 1989). Multiple cases enable building more robust, generalizable, and parsimonious theory than single cases (Eisenhardt & Graebner, 2007). Our embedded design has several levels of analysis (i.e., round and venture) to improve the likelihood of rich and accurate theory (Yin, 1994).

We focus on venture executives seeking new investment ties with venture capital and corporate venture capital investors (whom we term “professional investors”). We define an *investment tie* as a relationship between a venture and professional investor that entails the infusion of capital resources, often extensive advice, and sometimes other resources in exchange for equity (Hsu, 2004; Katila et al., 2008). Ventures typically seek investment ties in a series of discrete *rounds*, with each round providing capital for the near future and including one or more investors with the same terms (Byers, Dorf, & Nelson, 2010). First rounds may include one or several investors. Later rounds typically involve all prior professional investors plus one or more new ones (Byers et al., 2010). Our pilot interviews revealed that venture executives and investors generally prefer to add at least one new investor (termed the “lead investor”) in each round to set the round price and so gain a closer approximation of fair market value for all parties. Following industry norms, we call the first round over \$1 million “series A” and label subsequent rounds with sequential letters; if a round preceded the series A, this was labeled the “seed” round.

New investment ties were an attractive context for our study for several reasons. First, investment ties are important for ventures. They infuse critical resources (Hallen, 2008; Katila et al., 2008), influence survival (Shane & Stuart, 2002) and status (Gulati & Higgins, 2003; Hsu, 2004), shape industry architecture (Santos & Eisenhardt, 2009), and spur the likelihood of acquisition and going public (Hochberg, Ljungqvist, & Lu, 2007). Second, tie formation efficiency is important because ventures often have scarce managerial talent and need resources quickly (Vissa, 2010; Zott & Huy, 2007). Third, since ventures vary widely in their success in forming investment ties (Kirsch, Goldfarb, & Gera, 2008), there is likely to be useful variation in how firms form ties. Finally, since venture executives usually seek new investment ties in each round, we could track within-firm (as well as across-firm) variation in how executives attempt to form ties. Within-firm tracking controls several extraneous sources of variation and is a significant advantage of our research design.

A key issue is whether venture executives are primary actors in forming new investment ties. Several sources support the view that they are. First, our pilot interviews with both investors and venture executives indicated that although existing investors often give advice about fund-raising strategies, suggest potential investors, provide introductions, and sometimes veto a potential investor, venture executives typically develop the actual strategy for a round, generally choose which potential investors to target, and personally handle the interactions underlying investment tie formation (e.g., pitching, providing updates, answering due diligence questions, etc.). By contrast, professional investors have conflicts of interest regarding valuation and extensive demands on their time that circumscribe their role. Second, our cases corroborate this view in examinations of multiple funding rounds in multiple firms. Third, extant research is consistent. For example, the primary role of venture executives has been supported in research based on detailed fieldwork with entrepreneurs forming ties including equity relationships (e.g., Ozcan & Eisenhardt, 2009; Zott & Huy, 2007), large-sample research on entrepreneurial tie formation (Hallen, 2008; Hsu, 2004; Katila et al., 2008), and research on investor decision processes (Bruno & Tyebjee, 1985; Chen et al., 2009; Kirsch et al., 2008). Although a few studies have asserted that existing investors “invite” potential investors to form new investment ties (e.g., Sorenson & Stuart, 2008), these studies have not examined either the actual tie formation process or the alternative explanation that venture executives play a primary



role in forming new investment ties. Overall, our data and most research indicate that venture executives and existing investors actively engage in the process of seeking new investments but that venture executives have primary responsibility (especially for the interactions that influence tie formation) and so are particularly important for tie formation efficiency. Overall, we rebalance the venture capital syndication equation by emphasizing the critical role of venture executives.<sup>2</sup>

The setting for our research is the internet security industry, in which firms develop software products to safeguard computer networks from hackers and viruses. This setting was appropriate for several reasons. First, studying a single industry enables more valid comparison of ventures. Second, this industry attracts a variety of executives because developing an initial product often takes only a few engineers and about 9–18 months, yet ventures can become large and highly profitable (e.g., Barracuda Networks). Thus, the industry attracts executives who range from highly successful, serial entrepreneurs to novices who pay employees in IOUs. Such variety increases the likelihood of diverse strategic actions for tie formation.

Our sample was nine internet security ventures founded in 2002. We tracked their attempts to form new investment ties from founding through 2006. We chose 2002 because this founding year was sufficiently distant from our data collection period (2005–06) to allow multiple attempts to form new investment ties to have occurred and yet recent enough that respondents were likely to recall events correctly (Huber & Power, 1985). Cohort sampling is especially useful as it enables comparison of similar ventures under the same industry and economic conditions.

We selected these ventures from the VentureXpert database, which provides accurate data on U.S. venture financing (Gompers & Lerner, 1999; Kaplan & Schoar, 2005). We used VEIC codes 2721, 1561, and 2675 to identify internet security ventures. Our research is theory building in nature, and so our aim was to induct accurate, parsimonious, and generalizable theory. In keeping with this aim, we used theoretical sampling to select focal ventures (Eisenhardt, 1989). In contrast to random sampling, which is appropriate for deductive research using

statistical analysis, theoretical sampling is purposefully nonrandom. Each case is chosen for theory-building reasons—that is, to illuminate the focal phenomenon and fill theoretical categories that enhance generalizability (Eisenhardt, 1989).<sup>3</sup> Thus, sample bias is not germane.

In keeping with our theoretical sampling approach, we chose ventures with at least one investment tie. This enabled selection of ventures that evidenced the relevant phenomenon (i.e., forming new investment ties). By contrast, it eliminated ventures that lacked “trivial” necessary conditions for tie formation (Fiss, 2007); for example, they did not try to form ties (e.g., chose to bootstrap) or lacked sufficient quality to form ties regardless of strategic actions. Although we selected ventures with at least one new investment tie, the resulting sample has high within-firm (at the tie attempt level) and across-firm variation, including variation in failed attempts. Within-firm variation is especially striking—that is, the same executives used different strategic actions with varied outcomes. This variation is useful for our aim of inducting accurate, parsimonious, and generalizable theory.

Applying this criterion, we selected two groups of ventures, as summarized in Table 1. Four firms (group A) were in Silicon Valley and founded by serial entrepreneurs whose past ventures received professional investment and had either gone public or been acquired. By selecting ventures with many advantages identified in prior research (i.e., strong prior ties, strong signals of quality, and many local potential partners [Hallen, 2008; Hsu, 2007]), we focused on how well-endowed executives form ties efficiently. In keeping with our use of theoretical sampling to improve generalizability, we also se-

<sup>2</sup> We thank an anonymous reviewer for suggesting clarification of the roles of venture executives and existing investors. Further, recent research on banking syndicates indicates that clients exert a greater influence on the formation of syndicates than do investment banks (Shipilov & Li, 2010). In contrast with prior research, this research points to the greater influence of vertical ties in triads, over horizontal ones, as do we.

<sup>3</sup> Several logical differences underlie sampling for theory-building (inductive) research versus theory-testing (deductive) research. First, theory-building research using cases goes from data to theory and aims to induct generalizable theory. Theory-testing research goes from theory to data and is intended to rigorously test deducted theory. Second, theory-building research uses replication logic (Eisenhardt, 1989; Yin, 1994), whereby each case serves as a distinct experiment. In contrast, theory-testing research generally uses *pooled* logic, whereby an entire sample is pooled and serves as a single experiment. Third, whereas statistical theory testing using pooled logic relies on random sampling from a population (for example, Hallen [2008], our companion theory-testing paper, uses random sampling), theory building using replication logic relies on theoretical sampling in which each case is selected nonrandomly for the presence of the focal phenomenon and its ability to enhance theoretical generalizability. We thank an anonymous reviewer for encouraging us to clarify theoretical sampling.



lected five firms (group B) located in the United States (but not Silicon Valley) with founders having diverse experiences and ties to professional investors. Including Group B allowed exploration of tie formation efficiency in a rich variety of contexts with likely variation in behavioral strategies.

### Data Collection

We used several data sources: (1) interviews, (2) follow-up e-mails and phone calls to track ongoing investment attempts and clarify details, and (3) archives, including media, corporate material, and the VentureXpert database. Such triangulation bolsters confidence in the accuracy of the emergent theory. We also conducted eight pilot interviews with investors and venture executives. Adding to our contextual understanding were one author's experience as the cofounder responsible for securing professional investment ties at an internet venture and the other author's experience as an investor in multiple venture capital (VC) funds, advisor to a corporate venture capitalist, and participant in the management of a VC fund.

The primary data source was semistructured interviews with two types of informants: (1) venture executives with key responsibilities for raising a round, typically the CEO of a firm, non-CEO founders of the firm, and (in some cases) the firm's chief financial or technology officer (CFO or CTO), and (2) representative investors who invested in the round. A key strength is our rare interview data about actions (e.g., failed attempts, strategic reasoning) viewed from both investor and executive perspectives that are unavailable from other sources. Interestingly, many investors considered ties with several sampled ventures, thus adding unusually rich comparative data. We conducted 51 interviews plus follow-ups on ongoing attempts. Each interview was 45–90 minutes long, taped, and transcribed.

In each venture, we began with an *overview interview* with the CEO, the executive identified in our pilot interviews as most relevant. This interview focused on the venture's founding, competitive position, executives, and an open-ended chronology of its investment history. We then conducted *round interviews* for each attempted round with the actively engaged venture executives (typically one or two individuals). This interview centered on the chronology of events, including interactions with potential investors, offers, and round outcome. We also conducted *investor interviews* with representative professional investors in the firms. The focus was the investor's history with the venture, including chronologies of round attempts in which the investor

was involved and also round attempts in which other sampled ventures approached the investor.

We addressed potential informant bias in several ways. First, we triangulated data from multiple sources and informants for each round and venture, including accounts from both venture executives and investors. Second, since most ventures were seeking new investment ties during our study, we blended retrospective accounts, which offer efficiency, with real-time accounts of ongoing attempts (Leonard-Barton, 1990). Third, we used open-ended questioning of highly knowledgeable informants regarding recent, important activities. This practice limits recall bias and enhances accuracy (Golden, 1992; Koriati, Goldsmith, & Pansky, 2000). Fourth, we used "courtroom questions" that focused on factual accounts of what informants did or observed others doing (e.g., dates, meetings, participants) and avoided speculation (Huber & Power, 1985). Fifth, we gave anonymity to our informants and their firms, which encourages candor. Finally, our informants, especially venture executives, were very motivated to be accurate because they were highly interested in learning how to raise funds more efficiently. Such strong interest among informants usually improves the accuracy of their accounts.

### Data Analysis

Following multiple case study methods (Eisenhardt, 1989), we began by writing case histories of the tie formation process for each venture. To ensure completeness and accuracy, a second researcher reviewed the data and formed an independent perspective that we integrated into each case. We had no a priori hypotheses.

In keeping our use of with inductive methods (Eisenhardt & Graebner, 2007), our definition (given earlier) and assessment of tie formation efficiency emerged from our informants. First, we measured *investment completion* by whether an attempt yielded a formal investment offer that was accepted. Second, we measured *time to form* by computing the months elapsed from the time when executives formally began to look for new investors for a specific round until the time when they received their first formal investment offer. Although our definition of efficiency includes time and effort, a venture's executives (CEO and often CFO) usually work full time on fundraising when they are formally seeking new investment ties. Thus, time and effort are highly correlated in our setting. Since time is more easily measured, we (and our informants) used time as the measure of both. Third, we measured *investor desirability* by whether (1) the firm received multiple offers from

desired investors and so could choose among them, (2) other investors were actively conducting due diligence when a desired offer was accepted, or (3) an explicitly desired investor (i.e., target investor) made an offer. We used these criteria because they indicate situations in which executives have not only successfully formed a tie, but have done so with a desired partner and/or from among desired partners. This indicates a desirable tie, not just an adequate one. It is important to note that investor desirability can change from round to round. For example, venture executives often consider a high-status investor (often at lower valuation) more desirable in early rounds (Hsu, 2004) and an investor (often of lower status) offering high valuation more desirable in later rounds (Byers et al., 2010). Thus, we measured investor desirability in terms of a firm's preferences in each focal round.

We designated a round's efficiency as *high* (new investment tie achieved in two months or less, and investor desirability is high); *moderate* (new investment tie with high investor desirability taking longer than two months to achieve, or new investment tie with low investor desirability achieved in two months or less); *low* (new investment tie with low investor desirability and taking longer than two months to achieve); or *abandoned* (no new investment tie). Since the ventures were somewhat consistent over rounds regarding their efficiency, we categorized them as high or low in efficiency by computing their average tie efficiency and designating a threshold value, as indicated in Table 2. "/H" was added to the pseudonyms of the highly efficient firms, and "/L" was added to the pseudonyms of those with low efficiency.

We used the individual case histories to conduct within-venture analysis. Our initial focus was identifying actions at the tie attempt (round) level. We then linked these actions to round efficiency, using replication logic. Although the ventures had some consistency, most also had both efficient and inefficient (or even abandoned) rounds. Analysis of Aspen/H, which achieved a "turnaround" (i.e., abandoned its first round, changed strategies, and achieved highly efficient rounds), was especially insightful. Once rough constructs and relationships had emerged, we began cross-venture comparisons by round. In keeping with replication logic, we then tested emerging theoretical relationships across ventures and within and across groups.

We also compared our emergent theoretical framework with extant literature to refine our construct definitions, abstraction levels, and theoretical relationships (Eisenhardt, 1989). Extant literature was especially useful in sharpening underlying logical arguments. We engaged in repeated iterations until

theoretical saturation—that is, close match between theory and data—was reached. The resulting theoretical framework explains the dramatic differences in tie formation efficiency that we observed. *Catalyzing strategies*, which we define as behaviors by which executives advantageously shape their firm's opportunities or others' inducements to form ties, emerged as a focal, new construct.

## HOW FIRMS FORM NETWORK TIES EFFICIENTLY

### Transforming Network Ties: Casual Dating

How do firms form ties efficiently? Social network research suggests firms are likely to use prior ties to form new ties (Gulati, 1995; Hallen, 2008; Hsu, 2007). Supporting this argument, we find network ties play a positive role in investment tie formation. Executives usually approached potential investors whom they knew (i.e., direct ties) or to whom they were introduced by a mutual acquaintance (i.e., indirect ties). For example Squaw/H's CEO restricted his searches to investors "that we could reference. We didn't go to anybody that we didn't know or know of." But executives less efficient in forming ties did the same. Purgatory/L's founder said: "I never cold-called any VC. I would always reference my way in. I don't think I ever got turned down to meet." So although important, network ties do not fully explain efficiency.

Instead, we find that firms often form ties efficiently when their executives engage in a catalyzing strategy they termed *casual dating*. Following their implicit usage, we define casual dating as an executive's informal but deliberate, repeated meeting with a few potential partners prior to attempting to form a formal tie. Thus, casual dating disentangles familiarizing potential investors from adversarial negotiation to make a deal. Central to casual dating is that executives explicitly avoid both purely social and investment tie discussions. This strategy is also not about chatting about the venture with potential investors whom an executive might meet in a setting such as at a dinner party or board meeting. Rather, casual dating's repeated interactions focus on gaining general advice about common entrepreneurial issues (e.g., business model, hiring), with the deliberate aim of expanding the pool of potential partners.

We assessed casual dating from investor and executive interviews. We found that most high-efficiency attempts included casual dating or strong direct ties (a contingency we detail shortly). In both groups A and B, casual dating is a key determinant of efficient tie formation. Attempts with casual dat-



**TABLE 2**  
**Investment Tie Formation Efficiency<sup>a</sup>**

Venture and Stage	Targeted Potential Partners	Outcome	Investment Completion	Months to Form	Investor Desirability	Investment Tie Formation Efficiency
<b>Group A</b>						
<i>Heavenly/H</i>						
Seed	1 VC.	Accepted offer from 1 VC.	●	1	●	High
Series A	2 VCs.	Accepted offer from 1 VC; other still doing due diligence.	●	1	●	High
Series B	10 VCs.	Accepted offer from 1 VC; four other offers.	●	1	●	High
Series C	1 VC.	Accepted offer from 1 VC.	●	1.5	●	High
<i>Squaw/H</i>						
Seed	1 VC.	Accepted offer from 1 VC.	●	1	●	High
Series A	1 VC.	Accepted offer from 1 VC.	●	1	●	High
Series B	Approached by VC.	Abandoned as VC backed out.	○	2	○	Abandoned
Series B	1 VC, 2 back-up VCs.	Accepted offer from 1 desired VC; others still doing due diligence.	●	1	●	High
Series C	3 VCs, then 12 VCs.	Accepted offer from 1 VC; five other offers.	●	0.5	●	High
<i>Mammoth/H</i>						
Series A	1 VC, then 15 VCs.	After a VC with a strong direct tie declined, accepted offer from 1 VC.	●	5	○	Low
Series B	9 VCs.	Accepted offer from 1 VC; one other offer; others still doing due diligence.	●	1	●	High
Series C	3 back-up VCs, 2 VCs.	Accepted offer from 1 desired VC; others still doing due diligence.	●	0.5	●	High
<i>Donner/L</i>						
Series A	10–15 VCs.	Abandoned.	○	2	○	Abandoned
Series A	30–40 VCs.	Accepted offers of 3 VCs; 4 other offers.	●	7	●	Moderate
<b>Group B</b>						
<i>Aspen/H</i>						
Seed	10 VCs.	Abandoned.	○	6	○	Abandoned
Seed	4 VCs.	Accepted offer from 1 VC; others still doing due diligence.	●	1	●	High
Series A	10 VCs.	Accepted offer from 1 VC; others still doing due diligence.	●	2	●	High
Series B	2 VCs, 3 back-up VCs.	Accepted offer from 1 desired VC; others still doing due diligence.	●	1.5	●	High
<i>Keystone/H</i>						
Series A	5 VCs, then 20 VCs.	Accepted offers from 2 VCs; 1 other offer.	●	6	●	Moderate
Series B	Approached by VC.	Accepted offer from VC.	●	6	●	Moderate
<i>Monarch/L</i>						
Series A	3 VCs.	Abandoned.	○	1	○	Abandoned
Series A	3 VCs, then e-mailed very many VCs.	Accepted offers from 3 VCs; others still doing due diligence.	●	5	●	Moderate
Series B	About 25 VCs.	Accepted offers from 1 VC.	●	3	○	Low
Series C	1 VC, later 4 back-up VCs.	Accepted offer from 1 less-desired VC.	●	5	○	Low
<i>Buttermilk/L</i>						
Series A	8 VCs.	Accepted offer from 1 VC.	●	4	○	Low
<i>Purgatory/L</i>						
Seed	3 VCs.	Accepted offer from 1 VC.	●	5	○	Low
Series A	About 60 VCs.	Abandoned.	○	6	○	Abandoned
Series A	About 30 VCs.	Abandoned.	○	8	○	Abandoned
Series A	About 30 VCs.	Accepted offers from 2 VCs; others still doing due diligence.	●	4	●	Moderate

<sup>a</sup> ● = present; ○ = not present. The order of the ventures is based on the average efficiency of attempted rounds within groups A and B. “High” = 3 points; “moderate” = 2 points; “low” = 1 point; and “abandoned” = 0 points. The threshold average efficiency of attempted rounds (H vs. L) = 2 points.

ing are likely to be completed, completed quickly, and completed with high investor desirability. We summarize these data in Table 3 and provide further data in Appendix A.

Squaw/H's series C provides an example of casual dating in group A. A few months prior to

seeking new investment ties, the venture's CEO began having lunches with three target investors. He focused on gaining advice, including advice about possible business models. As he described: "This is just casual. You'll talk about the business and stuff, but you won't pitch. And you won't go to

**TABLE 3**  
**Tie Formation: Paths and Efficiency<sup>a</sup>**

Venture and Stage	Catalyzing Strategies					Investment Tie Formation Efficiency
	Strong Direct Tie	Casual Dating	Timing around Proofpoints	Scrutinizing Interest	Crafting Alternatives	
<b>Group A</b>						
<i>Heavenly/H</i>						
Seed	●	○	○	○	○	High
Series A	●	○	●	○	○	High
Series B <sup>b</sup>	●	○	●	●	●	High
Series C	○	●	●	●	●	High
<i>Squaw/H</i>						
Seed	●	○	○	○	○	High
Series A	●	○	○	○	○	High
Series B <sup>c</sup>	●	○	○	○	○	Abandoned
Series B	●	○	●	○	●	High
Series C	○	●	●	●	●	High
<i>Mammoth/H</i>						
Series A <sup>d</sup>	●	○	○	●	○	Low
Series B	○	●	●	●	●	High
Series C	○	●	●	●	●	High
<i>Donner/L</i>						
Series A	○	○	○	○	○	Abandoned
Series A	○	○	●	●	● <sup>e</sup>	Moderate
<b>Group B</b>						
<i>Aspen/H</i>						
Seed	○	○	○	●	○	Abandoned
Seed	○	●	●	●	●	High
Series A	○	●	●	●	●	High
Series B	○	●	●	●	●	High
<i>Keystone/H</i>						
Series A	○	○	○	●	●	Moderate
Series B	○	○	○	●	○	Moderate
<i>Monarch/L</i>						
Series A	○	○	○	○	○	Abandoned
Series A	○	○	●	○	○	Moderate
Series B	○	○	●	○	○	Low
Series C	○	●	○	○	● <sup>e</sup>	Low
<i>Buttermilk/L</i>						
Series A	○	○	○	○	○	Low
<i>Purgatory/L</i>						
Seed	○	○	○	○	○	Low
Series A	○	○	○	○	○	Abandoned
Series A	○	○	○	○	○	Abandoned
Series A	○	○	●	○	● <sup>e</sup>	Moderate

<sup>a</sup> ● = tie or catalyzing strategy present in attempt; ○ = no such tie or catalyzing strategy.

<sup>b</sup> Heavenly/H series B—2 paths: Targeted both strong direct ties and indirect ties via catalyzing strategies.

<sup>c</sup> Squaw/H abandoned B—Strong direct tie initiated process, then quickly declined.

<sup>d</sup> Mammoth/H series A—2 paths: Targeted strong direct tie quickly declined; then targeted indirect ties via catalyzing strategies.

<sup>e</sup> Venture executives could have used crafting alternatives much sooner in the tie formation process than they did.

the partner meeting [i.e., where up or down investment votes occur] and you won't let them do diligence on you." After several months of lunchtime interactions that involved advice about the venture, the CEO informed the three investors that Squaw/H's board had officially decided to raise series C. Very quickly (within ten days), he received his first investment offer (i.e., a term sheet) from one of the casually dated investors. Others followed. This round was thus highly efficient, completed quickly and with low effort, and with a desired investor.

We also observed casual dating in group B. For example, two months prior to the expected start of his series B, the founder of Aspen/H casually dated two investors. He met each repeatedly, eventually several times a week. Meetings were casual and focused on general advice, including discussion about candidates for senior hires and technical alternatives. As he described: "They'd come into our office, maybe get a feel of the product or something like that. ... On some of the technology, we'd do some white-board sessions with them. But again, we wouldn't do any presentations." After five weeks of casual dating, Aspen/H's founder announced a series B round. Six weeks later, several potential investors accelerated their due diligence, and a casually dated investor made an offer that was accepted. The round was thus completed quickly, with modest effort, and with a desired investor.

Despite the efficiency of casual dating, it is less necessary when executives already have strong direct ties with targeted investors. We categorize a *strong direct tie* as one involving a prior substantial, personal, working relationship between an executive and investor. For example, in Heavenly/H's series A and series B attempts, the executives targeted investors to whom they had strong direct ties (e.g., investors for whom they had consulted or who had backed their prior ventures), and experienced high efficiency without casual dating.<sup>4</sup> Given the fluid communication and high trust of strong direct ties (Uzzi, 1997), these executives were able to use streamlined communication to familiarize potential investors. For example, Heavenly/H's CEO described his series B in-

teractions to familiarize strongly connected potential investors with the venture and its executives as "typically two or three meetings." Yet interestingly, even well-connected executives used casual dating in later rounds when they chose to approach investors to whom they had only weak or indirect ties. So casual dating is relevant for *many* types of firms.

In contrast, executives are less efficient when they use neither casual dating nor strong direct ties. For example, in both of Donner/L's two attempted series A rounds, the CEO approached investors at the time he hoped to form an investment tie. Yet in neither attempt was a tie quickly forthcoming. The founder abandoned the first attempt and slowly completed the second. This "just-in-time" approach to investors also occurred in group B. For example, executives at Monarch/L often approached investors when they needed capital. These executives abandoned some rounds and completed others slowly, gaining few desired investors. Overall, rounds with neither casual dating nor a strong direct tie were more likely to be abandoned, to take longer, and to involve less-desired investors.

Casual dating improves tie formation efficiency for several reasons. First, casual dating facilitates familiarization of investors with a venture (and vice versa) by distancing participants from the often adversarial negotiations of formal tie formation. Second, venture executives who ask for advice ingratiate themselves with investors (Gordon, 1996; Westphal, 1998). Asking for advice flatters an investor and validates the individual and her/his expertise, leading to positive affect and psychic indebtedness toward venture executives (Jones, 1964; Vonk, 2002). Moreover, asking for advice is a particularly subtle, and thus effective, ingratiation tactic as it cognitively focuses the target on providing advice, making the manipulation less overt (Stern & Westphal, 2010). Third, when potential investors' advice is followed, casual dating not only may improve the venture, but also "co-opt" investors by engaging them in the venture's development. Social psychology research indicates that cooptation amplifies liking by causing the coopted party to view the other party and the relationship with that party as a part of their own identity (Aron, Aron, Tudor, & Nelson, 1991; Elsbach & Kramer, 2003). Fourth, by delaying formal evaluation and negotiation, casual dating reduces the salience of conflict and inhibits self-serving attributions that might lead investors to perceive ventures less favorably (Molm, Peterson, & Takahashi, 2003). Overall, casual dating develops a network of potential partners who are familiar with and have positive affect for a venture prior to its seeking a formal tie. The

<sup>4</sup> We appreciate the encouragement of an anonymous reviewer to clarify casual dating and its relationship with strong direct ties. Casual dating involves recent, repeated, and deliberate interactions that are focused on general venture issues with the aim of creating familiarity that expands a venture's pool of potential investors. In contrast, many interactions in strong direct ties (e.g., meetings at a conference, board meetings of other firms, and social occasions) lack these traits. Given these distinctions, casual dating may occur both outside of and within strong direct ties.

result is transforming weak or indirect ties into stronger, although informal, direct ties.

In contrast, in the absence of either strong direct ties or casual dating, the interactions during which a potential partner becomes familiar with a venture come along with formally seeking a tie. Although the elapsed times for casual dating and just-in-time attempts are similar, the latter require more effort because interactions during formal tie attempts are often scripted presentations requiring much preparation. Also, since learning about a venture and making an investment are intertwined, just-in-time interactions are often formal, adversarial, and so less fluid and effective. Both sides are more likely to be wary of and to engage in deception (e.g., executives hiding information, potential investors faking interest), making communication less productive, familiarity more difficult to gain, and positive affect less likely. In contrast, casual dating takes fewer hours and less preparation to yield familiarity and positive affect more reliably.

Although casual dating is typically helpful, venture executives recognize potential drawbacks. One is that they might reveal excessive weakness. For example, as one executive told us, approaching investors too soon can be problematic if a venture's strategy is unclear, because investors may prematurely categorize the venture as low quality. Accordingly, this executive noted that he was careful about when and how he began casual dating. So even if he encountered a potential investor at a social (e.g., party) or business (e.g., conference) event, he avoided discussing the venture. Casual dating thus requires executives to be careful about timing and focus on general issues commonly faced by ventures.

Finally, how did potential investors view casual dating? Our investor interviewees recognized that they were being "casually dated." But they, like the executives, believed that casual dating was an easy way for them to get to know possible venture partners without spending a lot of time. It also allowed them to ingratiate themselves with executives and obtain an early lead in evaluating ventures. Casual dating also helped them learn more about the industry. Thus, although they typically did not initiate casual dating, potential investors were often willing participants.

Overall, by shaping social embeddedness, executives proactively expand their ventures' networks of potential partners. In effect, casual dating activates indirect and weak ties to potential partners. Thus, executives who use strong direct ties or casual dating begin formal tie formation with a robust portfolio of potential partners that makes tie formation efficiency more likely.

*Hypothesis 1. Executives who use either casual dating or target strong direct ties are likely to form new interorganizational ties more efficiently.*

### **Amplifying Signals of Quality: Timing around "Proofpoints"**

Research indicates that information signals of quality improve the likelihood of tie formation (Ahuja, 2000; Eisenhardt & Schoonhoven, 1996; Podolny, 1994). In the context of ventures seeking investments, information signals such as firm progress, founder accomplishments, and existing investors' high status are important signals of venture quality, and thus are likely to attract potential investors (Gulati & Higgins, 2003; Hallen, 2008).

In keeping with this argument, executives efficiently forming investment ties had backgrounds of accomplishment, and their ventures had made progress. For example, when seeking a series B round, Mammoth/H's founder could show a strong background (e.g., her prior venture was acquired), and her current venture was selling products. Yet executives experiencing less efficiency often had equal signals—for example, although Monarch/L's founder was a successful serial entrepreneur and the firm had a product prototype, this executive abandoned his first attempt at a series A. Similarly, some executives with high-status investors had inefficient attempts (e.g., Monarch/L's later rounds), but others with lower-status investors had highly efficient attempts (e.g., Squaw/H's series A). Thus, although signals of quality are important, this mechanism does not fully explain variation in tie formation efficiency.

Instead we find that firms often form ties efficiently when they formally begin to seek a tie using a second catalyzing strategy: *timing around "proofpoints."* Both investors and executives used the term "proofpoint." Building on their implicit definition, we define a proofpoint as a positive signal of substantial venture accomplishment of a critical milestone that is confirmed by key external (not internal) actors. By involving external confirmation, proofpoints provide relevant third-party validation of accomplishments. In our setting, proofpoints often focus on critical customer milestones, such as a first customer's paying for a venture's product.<sup>5</sup> Recency further amplifies this already strong information signal of venture quality.

<sup>5</sup> Specific proofpoints depend on context. For example, customer actions were proofpoints in our setting of internet security. By contrast, proofpoints are likely to depend on the actions of regulatory agencies (e.g., the



Proofpoints are distinct from other information signals that do not resolve a critical uncertainty. Investors pay particular attention to the former as a strong signal and discount the latter. For example, investors regarded customers using a venture's product as a proofpoint when the customers said the product was complete (e.g., Heavenly/H's series A). But investors did not regard customers' using a product as a proofpoint when the customers believed key product features were missing (e.g., Donner/L's first attempted series A). This criterion of resolving a critical uncertainty also distinguishes proofpoints from many legitimating endorsements—that is, obtaining a fourth high-status customer may be a legitimating endorsement (Podolny, 1993; Rao, 1994), but it is not a proofpoint. Finally, the quality signal of a proofpoint is further amplified when its achievement was recent.

Using our data, we assessed timing around proofpoints by whether executives formally began a tie attempt within three months of accomplishing at least one proofpoint. We find that high-efficiency attempts involved either timing around proofpoints or strong direct ties (a contingency we detail shortly). We summarize these data in Table 3 and provide more complete data in Appendix B. Timing around proofpoints guides executives as to when to begin to seek ties formally, and so it follows casual dating. Executives time around proofpoints in several ways.

First, executives may use *acceleration*, seeking a new tie before the tie is needed. For example, when Heavenly/H had obtained a paying customer (a proofpoint), a Heavenly/H investor advised the venture's CEO to raise its series C, even though funds would not be needed for about nine months. This investor noted, "We had enough proofpoints to show that we had a market, and I'm not sure we could've gotten a better price two more quarters from now. Maybe a year from now, but we would've needed the capital before then." The CEO did so, and the desired investor quickly made an offer within two months of being approached. Overall, tie attempts using acceleration to time around proofpoints (in both groups A and B) were completed with moderate to high efficiency.

Second, executives may use *preemptive structuring* to synchronize a future tie attempt with a future proofpoint. For example, Heavenly/H's founder raised US\$4 million in series A because he thought this was the capital necessary to reach the next proofpoint of "finishing off the product." When the CEO

later wanted to attempt series B, the anticipated proofpoint had just been reached, and the round was completed with high efficiency. Overall, such rounds were typically highly efficient.

A third tactic is to *delay* a tie attempt until a proofpoint is achieved. For example, when Aspen/H was running out of capital prior to having a paying customer (its next proofpoint), the founder delayed seeking new ties. When a customer finally purchased the product, the founder immediately sought the series B round, which was completed with high efficiency.

Despite the efficacy of timing around proofpoints, we observed that it is less necessary when strong direct ties are present. For example, Squaw/H executives relied on the trust inherent in their strong direct tie with their targeted investor for their seed round to signal the high quality of the venture via quick, credible communication with this investor. They did not time around a proofpoint. Similarly, they also relied on a strong direct tie (with immediate proofpoint) in their highly efficient series A. Overall, potential partners may not require the amplified signaling of timing around proofpoints when they can rely on trust, honesty, and rich communication with executives with whom they have strong direct ties to convey quality.

In contrast, tie formation without strong direct ties is less efficient when timed around "resource needs." For example, Purgatory/L's CEO began the series A attempt because the venture had "only \$800K or so." But his venture had no immediate proofpoint—that is, its product lacked essential customer features and was still in development. Although the CEO engaged in time-consuming and highly effortful meetings with about 60 investors, none committed to a tie. The CEO abandoned the round. His next attempt, again without an immediate proofpoint, was also abandoned. Only when a customer began using the fully featured product (a proofpoint) was the third attempt at series A completed. Similarly, when Monarch/L's CEO first attempted a series A, the venture had "written a first prototype and we were going to maybe start driving revenue [i.e., selling the product] in short order." But without external confirmation of the prototype's desirability, the venture lacked an immediate proofpoint. Though the CEO extensively prepared for meetings with three prominent investors, none moved forward. The CEO abandoned the attempt. After completing the first product sale (a proofpoint) three months later, the CEO again attempted a Series A and succeeded with moderate efficiency. Overall, tie formation attempts timed around resource needs are likely to be abandoned or slow, and have less-desired investors.

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FDA) in the biotechnology and medical devices industries. We thank an anonymous reviewer for encouraging us to clarify this.

Timing around proofpoints improves tie formation efficiency by amplifying the signal of quality. First, proofpoints are extreme signals of quality because they indicate achievement of unusually critical milestones. Further, since they are confirmed by external (not internal) actors, proofpoints are particularly credible and difficult-to-fake indicators (Spence, 1974). Thus, they are unusually strong information signals and so are especially likely to attract potential partners. Second, their recency further amplifies the signal because individuals overweight immediacy (De Bondt & Thaler, 1985; Kahneman, Slovic, & Tversky, 1982). Following the dictum, "What have you done for me lately?", potential partners inflate accomplishment quality on the basis of immediacy and discount distant or cumulative successes. Thus, potential partners are strongly attracted to ventures with immediate proofpoints, although actual quality may be unchanged. Finally, since it is such a strong quality signal, a recent proofpoint is highly persuasive (Cialdini, 1993), making it easier for individuals to convince others in their firms to form a new tie.

Although timing around proofpoints is often helpful, executives recognize potential drawbacks. For example, acceleration and preemptive structuring require accurate foresight of the timing of future accomplishments and resource needs. This is often difficult because executives typically face high uncertainty, especially in new markets. A second drawback is that, although delay does not require foresight, it often involves significant hardships (e.g., forgoing salaries) that restrict action and endanger morale. Thus, although acceleration and preemptive structuring are preferable because they limit hardship, delay is more widely feasible because it does not require foresight. Overall, timing around proofpoints requires a careful linkage of resource needs, venture accomplishments, and tie formation attempts that is not always easy to do.

What did investors think about timing around proofpoints? We observe that investors are consciously attracted to proofpoints. For example, in describing his lack of interest, a potential investor noted: "What you're missing for this to be attractive is a handful of reference customers where you've got deployments [i.e., a proofpoint]." Moreover, investors perceive proofpoints as strong signals of progress. For example, Heavenly/H's seed investor referred to each proofpoint as the next step that substantially bolstered the likelihood of venture success. Investors were also attracted to timing around proofpoints because they reduce type I errors (i.e., false positives). By contrast, investors were less sensitive to type II errors (i.e., false neg-

atives) because they had many more attractive investment opportunities than they could address.

A key point is whether timing around proofpoints is available only to high-quality ventures. Although it is probably true that very low quality ventures will not have proofpoints, all of our ventures were above this quality threshold and achieved several. Thus, although proofpoints are rare (occurring about once per year), timing around them is often feasible. But surprisingly, executives do not always time around proofpoints, even when they easily can. For example, the timing of Monarch/L's failed series A was close to a proofpoint (about three months away), but the attempt was not delayed.

Overall, timing around proofpoints is a catalyzing strategy that amplifies signals of quality. Although casual dating is a network action that expands opportunities for ties prior to their being formally sought, timing around proofpoints is a signaling action that follows casual dating. It guides when to formally seek ties. Executives who have strong direct ties or who use timing around proofpoints launch formal tie formation by sending strong signals of quality that attract desired potential partners.

*Hypothesis 2. Executives who either time around extreme signals of quality such as proofpoints or target strong direct ties are likely to form new interorganizational ties more efficiently.*

### **Culling Network Nodes: Scrutinizing Interest**

According to resource dependence theory, firms are more likely to form ties when they have resources that potential partners want (Gulati, 1995; Pfeffer & Salancik, 1978). This suggests that executives are likely to form ties to investors with preferences for their ventures' particular resources (Eisenhardt & Schoonhoven, 1996). For example, investors often form ties with ventures in specific regions, development stages, or industries (Gupta & Sapienza, 1992). But although this research is helpful, it focuses on easily observed preferences. In reality, investors often have subtle preferences, or their preferences change, or they do not even know their preferences. Moreover, as Graebner (2009) observed, potential partners may consciously deceive and string along venture executives, or inflate the extent of their own interest. Thus, it can be challenging for venture executives to discern which potential partners are actually interested at the time that their venture seeks to form a tie.

Recognizing the challenge of assessing genuine interdependence, firms that form ties efficiently

often engage in a third catalyzing strategy: *scrutinizing interest*. We define scrutinizing interest as taking actions to discern potential partners' actual interest in a tie. Scrutinizing interest improves tie formation efficiency by enabling executives to ignore potential partners who are not interested and focus on those who are. Moreover, given that investor preferences are often fluid, scrutinizing interest typically occurs during the tie formation process. Scrutinizing interest or strong direct ties (a contingency we address later) occurs in many high-efficiency attempts. Table 3 summarizes these data, and Appendix C gives more complete data.

Executives scrutinize interest in several ways. First, they use *network verification*, in which they proactively ask mutual acquaintance(s) to verify an investor's actual interests. Recalling Keystone/H's series A, the founder said: "I would know somebody tied into a couple of VC firms. I would call that person and ask them if they had knowledge or if they could fish around about whether or not such and such a firm was still doing deals." Although he had numerous weak and indirect ties to potential investors, he identified about 20 target investors using network verification. Many were highly interested, and 3 made investment tie offers. Similarly, after casual dating between Heavenly/H's CEO and a potential series C investor and after timing around a proofpoint to launch the formal seeking of a tie, this CEO used network verification to ask a current investor to probe actual interest. This investor said: "I went through the backdoor and asked 'Are you guys sniffing us out? Or are you really open to going ahead?'" After confirming interest, Heavenly/H's CEO devoted considerable attention to this potential investor, who made an offer six weeks later. Overall, tie attempts using network verification enabled executives to focus their networks and were often highly efficient.

Second, executives scrutinize interest by *direct analysis* of interactions with potential investors. Mammoth/H's founder was particularly astute at this. She paid close attention to how quickly investors called her back after a meeting (i.e., the number of days), how quickly they began due diligence (i.e., the number of weeks), and whether they included a partner. For example, this CEO devoted little time to meeting with associates in a potential investor firm in the series B attempt. But once a partner in the investor firm began calling, she devoted "a lot of attention" to this investor, which extended an offer within a month. Similarly, in his highly efficient second series A attempt, Aspen/H's founder ignored investors who involved only associates and focused his time on meeting with potential investors who sent partners. Overall, tie at-

tempts with direct analysis were often efficient. Moreover, since network verification and direct analysis rely on different information, they are complementary and together allow executives to scrutinize interest especially well.

Despite the efficiency of scrutinizing interest, it is less necessary when executives use strong direct ties. Neither Heavenly/H nor Squaw/H scrutinized investor interest in their seed or series A rounds, and yet these rounds were completed with high efficiency. When we probed, these executives revealed long work histories with the targeted investors. In keeping with the existence of strong direct ties, these targeted investors were honest about their actual interest, which mitigated the need for scrutinizing interest. For example, when Mammoth/H's CEO approached an investor from her successful last venture for series A, he quickly said no. So although delayed by her initial targeting of this investor, the CEO moved on and used scrutinizing interest to eliminate unlikely potential investors, focus on genuinely interested ones, and salvage the round.

In contrast, without scrutinizing interest or strong direct ties, attempts to form ties are less efficient. Indiscriminately "shopping for ties" does not distinguish well between genuine and faked interest. By believing easily faked or misleading indicators of interest, executives misallocate their effort and waste time. For example, Buttermilk/L's founder approached potential series A partners who had previously formed ties with internet security ventures and to whom he could be introduced. But although this founder had been a successful entrepreneur in this sector and had an extensive network, he did not use his network to verify interest. Several targeted investors met multiple times with the founder, but none committed to a tie. After much effort and delay, an untargeted investor finally came forward to form a tie. Similarly, Purgatory/L's CEO met with any potential investor who would meet. He engaged with over 90 investors during his first two attempts at a series A. Although many professed interest, were friendly and enthusiastic, and repeatedly met, none moved to a tie. Both attempts were abandoned. Overall, when executives fail to scrutinize interest or use strong direct ties, tie attempts are often inefficient.

Scrutinizing interest improves tie formation efficiency by clarifying potential partners' actual interest. Executives can then cull the network and focus on potential partners with genuine interest. This is critical, because potential partners often exaggerate their interest to advantageously preserve their own alternatives, while discouraging ventures from forming ties with others (Padgett & Ansell, 1993; Santos & Eisenhardt, 2009). Indeed, we observed that many



potential investors enthusiastically meet, but rarely take the effortful next step of conducting due diligence and generally avoid saying no. Since meetings and verbal professions of interest are relatively costless for investors, they are not very useful for discerning actual interest. Yet ironically, venture executives often find such actions persuasive, because they are flattering and appear to validate the venture (Jones, 1964; Westphal, 1998). Moreover, given the tendency of individuals to see another's level of trust and honesty as matching their own (Graebner, 2009), honest venture executives often overestimate the interest of deceptive investors. Scrutinizing interest helps avoid such overestimation by triangulating potential partners' interest with credible behavioral cues and third-party information. Overall, like casual dating, scrutinizing interest is a catalyzing strategy by which executives shape their networks. But while casual dating adds and strengthens relationships, scrutinizing interest culls less promising potential partners and creates a focused, better network of potential partners.

Although often useful, scrutinizing interest has potential drawbacks. One is that executives may incorrectly cull potential partners who are interested. But this is less problematic than it seems, because genuinely interested investors are sensitive to this possibility. For example, when Mammoth/H's CEO stopped meeting with associates of a potential investor, the partner intervened, attended meetings, and began due diligence. The CEO turned her attention back, and a tie was quickly formed. In contrast, uninterested investors usually do not escalate their efforts when executives cull them. Another drawback is that network verification requires that network intermediaries have relatively strong relationships with potential partners. So when indirect ties are few, this approach is unlikely to work.

What do investors think of scrutinizing interest? Many confessed that they frequently exaggerate their interest to keep open the possibility of a tie. As one confessed: "I have a set of hot ventures and a set of cold ventures. I act interested in both, but I'm moving the hot ones along." Likewise, investors also spoke about the useful information gained in meeting executives even when they were not interested in a tie. For example, a Monarch/L's investor claimed that he understood the internet security space because "we'd seen [but not invested in] several companies in the space." So investors often avoid rejecting ventures outright, suggesting that venture executives could easily waste their time and effort.

Overall, scrutinizing interest helps executives to discern actual interest so that they can then cull unlikely potential partners and focus on the most promising ones. Thus, timing around proofpoints is

a signaling action that guides when to form ties, but scrutinizing interest is a network action that guides whom to target to form ties. Executives with strong direct ties or scrutinizing interest better distinguish genuine from faked or exaggerated interest and so can cull their networks to focus on the most promising potential partners.

*Hypothesis 3. Executives who either scrutinize the interest of potential partners or target strong direct ties are likely to form new interorganizational ties more efficiently.*

### Creating Signals of Scarcity: Crafting Alternatives

Research on tie formation has neglected how partners finalize ties. Yet finalizing ties is likely to be challenging, especially when one potential partner has no immediate need for the tie or has multiple suitors vying for its favor. Particularly when such asymmetries exist, one side is likely to hesitate and require more time or effort before committing.

We observed that ventures often face this challenge. In line with previous research (Kirsch et al., 2008), we observed that many investors were approached by far more ventures than they could accommodate. Thus, we observed that even very interested investors were often reluctant to commit to ties. An investor summarized: "There is no incentive for me to act too soon. I would rather give the company plenty of time to either prove to me that what they said—three-four months ago was correct or prove that it was incorrect."

Recognizing the challenge of gaining commitment, firms that form ties efficiently often use a fourth catalyzing strategy: *crafting alternatives*. We define crafting alternatives as developing multiple routes to end the tie formation process. Crafting alternatives is a signaling action that promotes efficiency by motivating very interested potential partners to commit. Thus, crafting alternatives occurs at the end of the sequence of catalyzing strategies, and it focuses on creating inducements to conclude the tie formation process. We assessed crafting alternatives from investor and executive interviews. Table 3 summarizes these data, and Appendix D adds details. Most high-efficiency attempts used crafting alternatives or strong direct ties (a contingency we detail shortly). Executives crafted alternatives in several ways.

First, executives may establish *different resource paths* that use funding sources other than investors (e.g., friends, bootstrapping) and entail different decision processes than those of desired investors. For example, for Aspen/H's successful seed round, the CEO decided to use his family wealth and cut



expenses if his desired investor continued to delay. He gave this investor a two-week deadline, which the investor met. Similarly, in the series C round, Heavenly/H's CEO told the desired investor that he would use the venture's cash and abandon the round if a tie were not forthcoming. The investor made an offer in six weeks. Rounds with this tactic were often highly efficient.

Second, executives may approach *less-desirable partners* in addition to desired ones. The former are usually of lower status, relative to the ventures' quality. Since these investors often regard speed as their advantage, they are especially useful for this tactic. A good example is series B at Aspen/H. After casually dating two high-status investors, the founder formally decided to seek new investment ties. The founder approached the casually dated investor that he preferred but also contacted three lower-status investors known for their speed. The latter rapidly launched due diligence and moved to a tie. Simultaneously, the founder kept his desired investor aware of the others' actions. The desired investor responded with a tie offer. Overall, approaching less desirable partners yields efficiency when used early, and it avoids abandonment when used later.

Third, executives may *structure competition* among highly interested investors by setting deadlines. Heavenly/H's CEO did this in its series B round. After several of the ten targeted investors scheduled partnership meetings (late-stage meetings consistent with high interest), the CEO informed the other desired investors of these actions and established a deadline. As he received offers, he kept the remaining investors informed. There were five offers within a month. Similarly, once Squaw/H's CEO began partner meetings indicative of high investor interest in his venture's series C round, he set a ten-day deadline for offers and received six. Overall, attempts in which executives structure competition via deadlines typically have at least moderate efficiency.

Crafting alternatives, however, is less necessary when executives have strong direct ties to targeted investors. For example, in Heavenly/H's and Squaw/H's seed rounds, executives targeted investors with whom they had strong direct ties and finalized those ties quickly without crafting alternatives. The honesty and trust of strong direct ties mean that investors avoid disingenuous stringing along of executives and commit (or not) quickly. But even well-connected executives may craft alternatives when seeking ties outside their local networks, and crafting alternatives is thus relevant for *many* types of executives.

In contrast, executives were less efficient when they used neither strong direct ties nor crafting alternatives. For example, although five desired investors in Monarch/L's series A conducted due diligence

(which is consistent with high interest), the CEO did not craft alternatives such as structuring competition with a deadline. Although the investors remained interested, the attempt consumed considerable effort by the CEO and closed very slowly (taking five months). Indeed, low-efficiency rounds often involve multiple potential investors who meet repeatedly with venture executives without making offers. Thus, hoping for ties in the absence of inducements for closure is typically inefficient.

Crafting alternatives improves tie formation efficiency by amplifying the signals that induce potential partners to commit. First, although even very interested potential partners often wait to form ties or demand more effort, crafting alternatives signals scarcity. Such signals motivate greater interest, urgency, and risk taking as investors do not want to lose out (Brehm, 1966; Cialdini, 1993; Tversky & Kahneman, 1981). Second, crafting alternatives enhances the perceived quality of a venture through "social proof" arising from the interest of others. Decision makers rely on social proof, defined as looking to others for cues to appropriate action, when they themselves are uncertain as to a course of action (Cialdini, 1993; Podolny, 1993; Rao, Greve, & Davis, 2001). Since venture quality is often difficult to evaluate directly, social proof is likely to influence investors' willingness to commit. Third, and related to social proof, crafting alternatives helps executives break self-reinforcing "bystander apathy," whereby each potential investor interprets others' lack of commitment as indicative of these others' judging the venture to be of low quality, and thus also decides not to commit (Banerjee, 1992; Bikhchandani, Hirshleifer, & Welch, 1992; Latané & Darley, 1968).

Although crafting alternatives is often helpful, there are potential drawbacks. For example, since investors are often skeptical of executives' claims, alternatives are ineffective if they are not perceived as credible. For example, potential investors ignored Purgatory/L's vague claim of "strong interest" by an unnamed investor in their first series A attempt. In contrast, since the firm had products to sell, Donner/L's alternative of bootstrapping in its second series A was credible and led to efficient tie formation. Second, executives may overestimate the interest of potential partners. As a result, they may have to accept an undesirable alternative, such as a tie with an unwanted investor, or have no takers in a structured competition. Finally, structured competition is often infeasible because it requires high investor interest from multiple desired investors.

What do investors think of crafting alternatives? They are neither surprised nor offended. Instead, we found that they view it as effective. For exam-

ple, when Aspen/H's CEO threatened to fund the seed round himself, an investor praised: "It was a good strategy. I knew that regardless of if I wanted to play or not, the opportunity was going to go away in two weeks. It was real and credible and probably got me off of my rear end." But investors also often believed that executives might duplicitously exaggerate, and so they typically probed crafted alternatives carefully. Thus, alternatives can induce potential partners to commit, but the partners must be convinced of the alternatives' validity.

Is crafting alternatives only available to high-quality ventures? As with proofpoints, there is probably a minimum quality threshold, but our ventures surpassed it. Thus, crafting alternatives is often feasible, and most ventures used this strategy in at least one round. But ironically, executives sometimes could have crafted alternatives much sooner than they did (e.g., in Monarch/L's series C), and so tie formation was unnecessarily inefficient. Executives can often craft alternatives, yet they do not always have the foresight to do so.

Overall, crafting alternatives is a catalyzing strategy that strengthens the signals that induce potential partners to commit. Although timing around proofpoints engages initial interest by signaling quality and guides when to begin the formal tie formation process, crafting alternatives closes the process by signaling scarcity and quality at the end. Thus, executives who have strong direct ties or who use crafting alternatives are more likely to induce partners to commit to a tie.

*Hypothesis 4. Executives who either craft alternatives or target strong direct ties are likely to form new interorganizational ties more efficiently.*

### **Toward a Process Theory of Efficient Tie Formation**

Our emergent framework indicates two equifinal paths by which firms efficiently form ties (Fig. 1). These paths address the same challenges in distinct ways and so are functionally equivalent. Table 4 summarizes the challenges and paths to efficient tie formation. The first path builds on *strong direct ties* and is available to privileged firms. Strong direct ties ensure a network of potential partners prior to the start of formal tie formation (obviating casual dating), communication of strong signals of quality when tie formation formally begins (obviating timing around proofpoints), rapid discernment of actual interest (obviating scrutinizing interest), and quick decisions regarding whether to commit (obviating crafting alternatives). Thus, this strategy re-

lies on attributes of strong ties (Powell et al., 1996; Uzzi, 1997)—that is, superior communication, familiarity, honesty, and trust—to achieve efficiency.

The second and more novel path relies on *catalyzing strategies* and is available to many firms. Here, firms ensure a network of potential partners prior to the start of tie formation through an "active waiting" strategy, *casual dating*, which transforms weak or indirect relationships into strong ties. Executives begin tie formation when they create strong signals of quality using a second catalyzing strategy, *timing around proofpoints*, which relies on the immediacy of critical accomplishments validated by others to amplify signals of quality. During tie formation, executives rapidly discern actual interest by using a third catalyzing strategy, *scrutinizing interest*. Finally, executives overcome hesitation at the end of tie formation with a fourth catalyzing strategy, *crafting alternatives*, by which they amplify the signals that induce potential partners to commit. Overall, this path of catalyzing strategies relies on a sequence of complementary actions to achieve tie formation efficiency.

Aspen/H is a telling example. Its two young founders were inexperienced and had no strong direct ties to potential investors. In the first tie attempt, the founding CEO failed to form a tie. He then restructured his approach. He casually dated two potential investors and delayed formally seeking ties until achieving a proofpoint. He then scrutinized interest using direct analysis to cull potential partners with exaggerated interest and focus his efforts. Once he had engaged an interested and desired investor, he closed the tie by crafting an alternative resource path to signal scarcity. This tie attempt was highly efficient. In his later attempts, he continued to use catalyzing strategies and formed ties with high efficiency.

Like all research findings, our study's findings may have alternative theoretical explanations. For example, perhaps a venture's early partners affect later tie formation efficiency. Indeed, we find that early partners sometimes introduce venture executives to later potential partners and that high-status early partners often attract later potential partners. Thus, as in prior research, here early partners influenced with whom later ties are formed (Gulati, 1995; Hallen, 2008). But we also find that these potential partners still insist on becoming familiar with a venture, still look for very strong signals of quality, often fake interest, and frequently hesitate to commit. As a result, although early partners may influence with whom ventures form later ties, they do not obviate the need for using catalyzing strategies (or having strong direct ties) to form ties efficiently. Appendix E summarizes the relevant data.

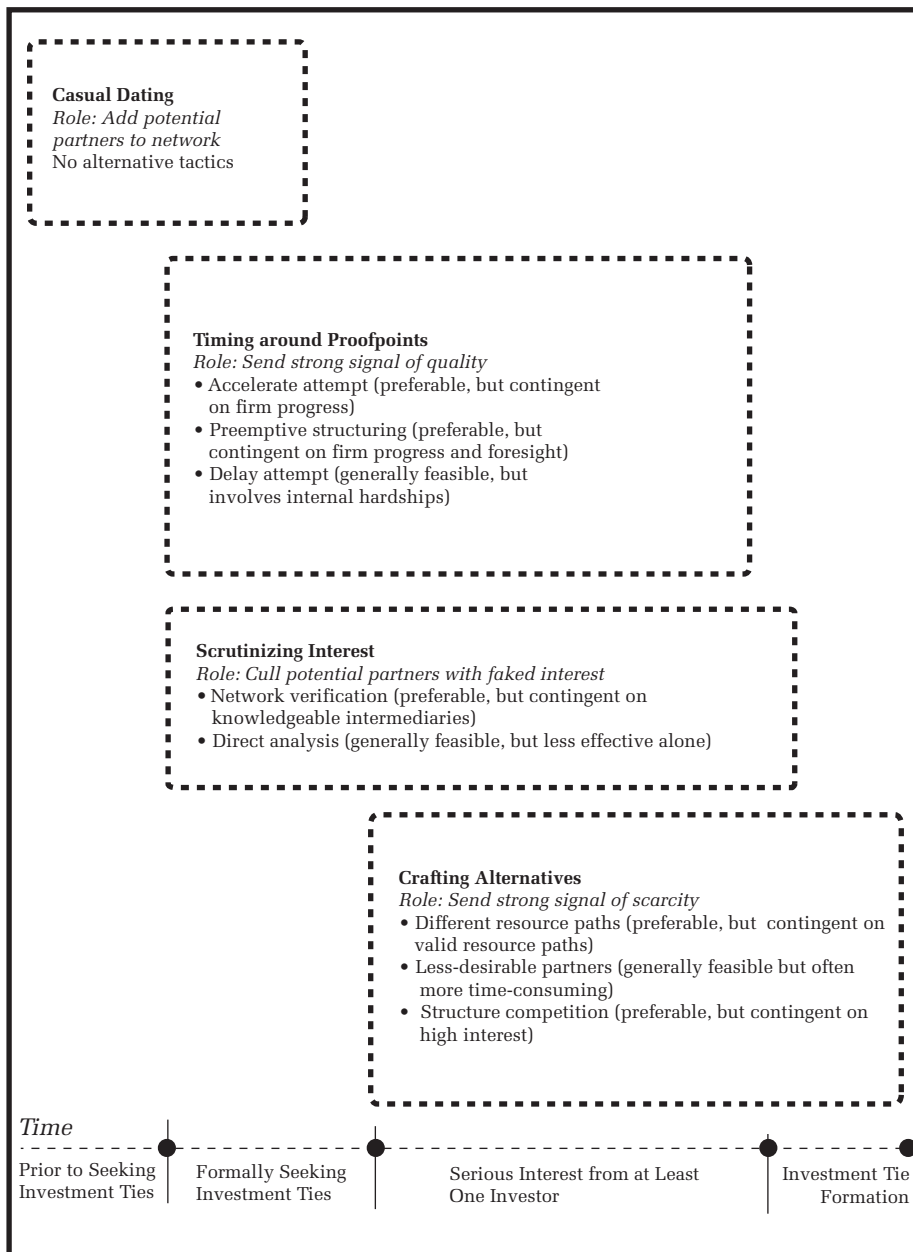
**FIGURE 1**  
**Two Paths to Efficient Tie Formation**

**Path 1: Strong Direct Ties**

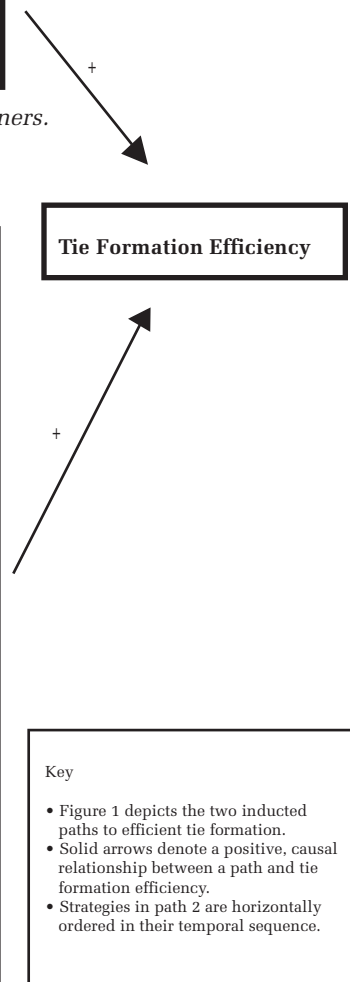


Path 1's primary usage: *When firms have strong direct ties to desired potential partners.*

**Path 2: Catalyzing Strategies**



Path 2's primary usage: *When firms lack strong direct ties or when desired potential partners lie outside the local network.*



**TABLE 4**  
**Challenges and Paths to Efficient Tie Formation**

Challenge	Catalyzing Strategy	Strong Direct Ties	Inefficient Strategy
Gaining network of potential partners prior to formal tie formation attempt	<i>Casual dating:</i> Uses interaction, ingratiation, and cooptation to gain familiarity and liking prior to negotiating. Shapes tie formation opportunities by ensuring a network of potential partners before formal tie formation begins.	<i>Strong direct ties:</i> Uses trust, honesty, and well-understood communication in strong direct ties to gain familiarity and liking quickly once formal tie formation begins and prior to negotiating.	<i>Just-in-time ties:</i> When potential investors are unfamiliar with the venture, gaining familiarity and liking mixes with adversarial negotiating and so creates conflict, distrust, and poor communication that impedes tie formation.
Having a very strong signal of quality that attracts potential partners	<i>Timing around proofpoints:</i> Uses third party validation of completing a critical milestone, amplified by immediacy, to send strong signal of quality. Shapes potential partners' tie formation inducements, attracting them with a sufficiently strong signal.	<i>Strong direct ties:</i> Uses the trust, honesty, and ease of communication of strong direct ties to quickly, credibly, and clearly convey otherwise hard to observe strong quality.	<i>Timing around resource needs:</i> Quality is not validated by a trusted source and not amplified by immediacy. So the signal of quality is not sufficiently strong to induce interest, and may suggest desperation.
Discerning genuine from faked interest among potential partners	<i>Scrutinizing interest:</i> Uses credible third party information and behavioral cues to cull potential partners with faked interest and focus on those with genuine interest. Shapes tie formation opportunities by ensuring a network of realistic potential partners to pursue during tie formation.	<i>Strong direct ties:</i> Given the honesty and trust inherent in strong direct ties, potential partners accurately and quickly indicate their actual interest.	<i>Shopping for ties:</i> Since executives are not effectively distinguishing between faked and genuine interest, they indiscriminately pursue potential partners. So they waste time and effort on those who lack genuine interest.
Motivating even very interested potential partners who hesitate to commit	<i>Crafting alternatives:</i> Uses strong signal of scarcity, often combined with social proof that signals quality, to motivate commitment. Shapes the inducements of very interested potential partners to commit to a tie.	<i>Strong direct ties:</i> Given the trust, honesty, and social constraint of strong direct ties, very interested potential partners quickly commit or not.	<i>Hoping for ties:</i> Naively assumes that very interested potential partners will commit when there is no immediate inducement to do so.

*Hypothesis 5. Executives who use either the strong direct ties path or the catalyzing strategies path are more likely to form new interorganizational ties efficiently.*

## DISCUSSION

We contribute to interorganizational network theory and the study of resource acquisition by entrepreneurs. A primary contribution is a new concept, *tie formation efficiency*. Network research has indicated that firms benefit when they have many network ties with the right partners (Ozcan & Eisenhardt, 2009; Powell et al., 1996; Uzzi, 1999). Our insight is that firms that form ties efficiently (i.e., quickly, easily, and with desired partners) are the most likely to achieve these superior tie, portfolio, and network out-

comes. Thus, although tie formation is relevant, tie formation efficiency is a more precise conceptualization of the source of high-performance network outcomes. Without efficiency, it is unlikely that firms can gain these outcomes.

### Theoretical Framework: Two Paths for Efficiently Forming New Ties

A second contribution is an emergent theoretical framework that unexpectedly identifies two equifinal paths for *how* firms form ties efficiently. The first builds on the well-known strategy of leveraging *strong direct ties* and is only available to privileged firms. The second relies on a new concept, *catalyzing strategies*. Whereas the literature's "rich get richer" descriptive account of tie formation is



based on the opportunities of existing embeddedness and inducements of current resources (Ahuja, 2000; Gulati & Gargiulo, 1999), this second path relies on strategic actions that advantageously shape opportunities and inducements to tie formation. These catalyzing strategies are particularly important because they are relevant to many firms.

With catalyzing strategies, executives begin with casual dating. Casual dating activates indirect or weak ties and transforms them into stronger direct relationships before the executives seek formal ties. Thus, casual dating expands the network of potential partners that have sufficient familiarity with a venture and sufficient positive affect for it to form ties. In contrast, just-in-time attempts mix gaining familiarity and positive affect with adversarial negotiations. This mixing inhibits developing productive working relationships and increases the time and effort required to form ties. An unexpected network insight is the plasticity of networks: actors can actively shape their embeddedness by expanding their opportunities for ties.

Second, executives launch the formal tie formation process by timing around proofpoints. That is, they time their tie attempts to coincide with recent achievement of milestones that reduce significant uncertainty. Timing around proofpoints amplifies quality signals. In contrast, timing around resource needs fails to take full advantage of significant accomplishments and may even convey desperation. An unexpected insight is the time-sensitive interpretation of signals: individuals value recent extreme signals of quality but discount cumulative signals and even similarly strong signals when they are distant—even when quality levels may be identical. Thus, deviating from the network literature, we highlight the perceptual nature of inducements: actors can actively shape others' inducements to form ties.

Third, executives scrutinize the interest of potential partners during the tie formation process. Like casual dating, scrutinizing interest shapes embeddedness. But unlike casual dating, which adds and strengthens ties, scrutinizing interest weakens and even eliminates ties by revealing faked interest by potential partners. In contrast, indiscriminate shopping for ties fails to account for duplicitous potential partners who avoid saying no and for the misleading nature of verbal expressions of interest and low-cost meetings. An unexpected contribution to network theory is our highlighting the value of exit: although the network literature emphasizes adding ties, actors can also create superior network outcomes by cutting relationships to create smaller but better portfolios of ties.

Fourth, executives end the tie formation process by *crafting alternatives* that induce very interested

but hesitant potential partners to commit. Like timing around proofpoints, crafting alternatives amplifies information signals that enhance the inducement of potential partners to form a tie. In contrast, naively hoping for ties is often insufficient to motivate even highly interested potential partners to commit. An unexpected insight is the importance of signals of scarcity: crafting alternatives capitalizes on the allure of scarcity and perception of urgency, even though actual quality may be unchanged. Thus, although the network literature emphasizes signals of quality, signals of scarcity are also critical to forming ties.

Together, the various catalyzing strategies are complementary network and signaling actions that enhance tie formation efficiency. Catalyzing strategies are the viable path when firms lack strong direct ties. But unexpectedly, they are also the path for privileged firms when they wish to gain ties outside their local networks. For example, executives of privileged firms in our study often selected the first path of strong direct ties early on but then switched to the second path when they sought distant ties to gain better valuations. Overall, catalyzing strategies are especially significant because they broaden access to superior network outcomes for many firms.

### Social Embeddedness and Information Signals

A third contribution is weaving together social embeddedness and information signals. Organization theory and sociology have long emphasized the social embeddedness of network ties (Gulati, 1995; Sorenson & Stuart, 2001; Walker, Kogut, & Shan, 1997), and economics and strategy highlight information signals (Ahuja, 2000; Dushnitsky, 2010; Spence, 1974). We contribute to these literatures by clarifying how these mechanisms relate.<sup>6</sup>

First, we contribute the insight that the network and signaling actions of catalyzing strategies are *complements*. Specifically, casual dating and scrutinizing interest are *network actions* that advantageously shape social embeddedness by transforming weak or indirect ties into strong ties and by weakening or even cutting ties that lack promise, respectively. These network actions shape a robust set of tie opportunities. In contrast, timing around proofpoints and crafting alternatives are *signaling actions* shaping potential partners' perceptions of a firm. They amplify signals of scarcity and quality that induce others to commit. Prior studies have cast information signals and social embeddedness as substitutes (Gulati & Gargiulo, 1999; Podolny,

<sup>6</sup> We appreciate the insight of an anonymous reviewer on bringing together these literatures.

1994), but we unexpectedly observed that they are complements—that is, they serve distinct yet necessary functions in the tie formation process.

Second, we suggest the insight that network and signaling actions have a *temporal order*—that is, network actions first shape the set of viable potential partners, and signaling actions then amplify their inducements to form ties. Although the prior literature neglects timing, we observe a network action–signaling action temporal order and a possible rationale. That is, network actions advantageously shape a set of viable opportunities for ties and so set the stage for tie formation. Signaling actions then influence the perceptions of the audience of potential partners and so enhance the likelihood of their commitment. The result is a temporal order.

Third, we contribute the insight that network and signaling actions may be *sufficient conditions* for efficient tie formation. Conversely, simply relying on current embeddedness or information signals may be insufficient. For example, the ties and status of early partners may influence with whom firms form ties (Gulati, 1995; Hallen, 2008), but they do not guarantee efficient tie formation. Potential partners may still need to become familiar with a focal firm and observe strong signals of quality, exaggerate interest, and delay. Catalyzing strategies address these issues. Thus, the key insight is that limited resources and few ties may be less of a hindrance to forming new ties than neglecting catalyzing strategies.

### Scope Conditions and Extensions

A key issue is generalizability. Catalyzing strategies are likely to be most germane for firms with *intermediate* embeddedness and quality. Catalyzing strategies can give these firms the boost necessary to overcome potential partners' tendency to require more time and effort. In contrast, catalyzing strategies may be only modestly helpful for firms with very high quality and strong direct ties. These firms may use catalyzing strategies, but primarily when they seek distant ties. Firms with low quality and few or no ties are unlikely to meet or attract potential partners, even if they attempt catalyzing strategies.

Catalyzing strategies are also likely to be most germane for ties requiring *extensive involvement* and difficult-to-exit *multiyear commitment*. Here, potential partners are likely to hesitate, and so catalyzing strategies can overcome this tendency. Such relationships include the VC investment ties that we studied and other long-term, high-commitment ties, such as conducting joint R&D and buyer-supplier relationships with high asset specificity. This further suggests that catalyzing strategies will be especially critical in biotech and other long product life cycle industries.

By contrast, short-term and low commitment ties, such as licensing agreements and angel investments (e.g., angels often engage only in early rounds [Hallen & McDonald, 2011]) may be less prone to hesitation, rendering catalyzing strategies less necessary. Finally, catalyzing strategies may be less necessary in “hot” markets where potential partners feel pressure to avoid delay.

Overall, catalyzing strategies are likely to matter most when potential partners have few limits on effort and time, and conversely, a focal firm has high penalties for additional time and effort. This mismatch often occurs when heterophilous firms such as ventures and established firms are potential partners. Ventures have limited managerial attention yet need ties quickly to overcome resource deficiencies. In contrast, established firms often have sufficient resources and few limits on time and attention (Katila et al., 2008). Overall, catalyzing strategies are most relevant when there is a time or effort *mismatch* between potential partners.

An important question is why some executives fail to use catalyzing strategies even when they could easily do so. Although answering this question is beyond our scope, our data suggest insights. Demographic explanations such as MBA training, age, and even entrepreneurial experience are not compelling in our data. A more promising explanation is location. Silicon Valley executives used catalyzing strategies more often even when they had strong direct ties. So catalyzing strategies may diffuse through relationships and imitation in entrepreneurially dense regions. But a more intriguing explanation is a cognitive one. Executives who sought ties just in time when they had resource needs, uncritically shopped for ties, and naively hoped for ties exhibited myopic and linear thinking. They did not incorporate the future (e.g., recognizing that potential partners may delay) or potential partners' perspectives. By contrast, catalyzing strategies require future-oriented and allocentric thinking to anticipate how potential partners will act. This suggests that the influence of cognition on network strategies is an unusually promising avenue.

### Toward a Strategic View of Network Agency

Research has emphasized a deterministic view of tie formation that is shaped by exogenously determined interdependence and embeddedness. Yet with a few exceptions (e.g., Hallen, 2008; Ozcan & Eisenhardt, 2009; Vissa, 2010; Zott & Huy, 2007), this work neglects the process of tie formation and the role of agency and strategic action. In contrast, we emphasize that an efficient tie formation process is critical to superior network outcomes. By identifying equifinal

strategies for efficient tie formation, we offer a particularly encouraging view for less-privileged actors such as entrepreneurs. Using catalyzing strategies, these actors may overcome their disadvantages and gain attractive ties, high-performance portfolios, central network positions, and ultimately superior firm performance.

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#### APPENDIX A Casual Dating

Venture and Stage	Approach to Casual Dating and/or Use of Strong Direct Ties	Strong Direct Tie <sup>a</sup>	Weak or Indirect Tie <sup>b</sup>	Casual Dating <sup>c</sup>	Investment Tie Formation Efficiency
<b>Group A</b>					
Heavenly/H Seed	<i>Strong direct tie</i> : Founders had previously worked with target VC.	●	○	○	High
Series A	<i>Strong direct ties</i> : Founders had previously worked with target VCs.	●	○	○	High
Series B	<i>Strong direct ties</i> : Founders/CEO had "previous working relationships" with six target VCs. Had weak / indirect ties with four others.	●	●	○	High
Series C	<i>Casual dating</i> : CEO and CTO casually dated target VC.	○	●	●	High
Squaw/H					

(Continues)

**APPENDIX A**  
**(Continued)**

Venture and Stage	Approach to Casual Dating and/or Use of Strong Direct Ties	Strong Direct Tie <sup>a</sup>	Weak or Indirect Tie <sup>b</sup>	Casual Dating <sup>c</sup>	Investment Tie Formation Efficiency
Seed	<i>Strong direct tie:</i> Founder focused on a VC who had backed him previously.	●	○	○	High
Series A	<i>Strong direct tie:</i> Founder focused on a VC who had backed him previously.	●	○	○	High
Series B	<i>Strong direct tie:</i> Founder approached by VC who had worked for founder.	●	○	○	Abandoned
Series B	<i>Strong direct tie:</i> Target VC backed CEO at prior start-up.	●	○	○	High
Series C	<i>Casual dating:</i> CEO and founder met with three potential investors multiple times for a few months before seeking tie. Described: "Casual. You'll talk about the business and stuff, but you won't pitch." (CEO)	○	●	●	High
<i>Mammoth/H</i>					
Series A	<i>Strong direct tie declined, then approached other investors at time of round:</i> VC with strong direct tie had invested in founder's prior start-up, but did not invest in this one.	●	●	○	Low
Series B	<i>Casual dating:</i> CEO casually dated VCs met in series A (but who had not made offers).	○	●	●	High
Series C	<i>Casual dating:</i> CEO casually dated previously interested VCs (who had not made offers).	○	●	●	High
<i>Donner/L</i>					
Series A	<i>Approached investors at time of round</i>	○	●	○	Abandoned
Series A	<i>Approached investors at time of round</i>	○	●	○	Moderate
<b>Group B</b>					
<i>Aspen/H</i>					
Seed	<i>Approached investors at time of round</i>	○	●	○	Abandoned
Seed	<i>Casual dating:</i> One VC had originally been approached in prior round and had expressed moderate interest. Executive casually dated him and another potential investor.	○	●	●	High
Series A	<i>Casual dating:</i> Founder casually dated one VC.	○	●	●	High
Series B	<i>Casual dating:</i> Founder casually dated two VCs under pretext that he wanted help finding a CEO but did not need money.	○	●	●	High
<i>Keystone/H</i>					
Series A	<i>Approached investors at time of round</i>	○	●	○	Moderate
Series B	<i>Approached by investor at time of round</i>	○	○	○	Moderate
<i>Monarch/L</i>					
Series A	<i>Approached investors at time of round</i>	○	●	○	Abandoned
Series A	<i>Approached investors at time of round</i>	○	●	○	Moderate
Series B	<i>Approached investors at time of round</i>	○	●	○	Low
Series C	<i>Casual dating:</i> CEO casually dated a VC who submitted (nonselected) offer in prior round.	○	●	●	Low
<i>Buttermilk/L</i>					
Series A	<i>Approached investors at time of round</i>	○	●	○	Low
<i>Purgatory/L</i>					
Seed	<i>Approached investors at time of round</i>	○	●	○	Low
Series A	<i>Approached investors at time of round</i>	○	●	○	Abandoned
Series A	<i>Approached investors at time of round</i>	○	●	○	Abandoned
Series A	<i>Approached investors at time of round</i>	○	●	○	Moderate

<sup>a</sup> ● = prior substantial, personal working relationships with VC; ○ = no such relationship.

<sup>b</sup> ● = weak tie (i.e., acquaintances who had not worked together) or indirect tie; ○ = no such relationship.

<sup>c</sup> ● = meetings with aim of gaining potential investors; neither social nor discussions of investment; ○ = no casual dating.

**APPENDIX B**  
**Timing around Proofpoints<sup>a</sup>**

Venture and Stage	Signals at Start of Round	Approaches to Timing of Seeking Tie	Strong Direct Tie	Timed around Proofpoint	Investment Tie Formation Efficiency
<b>Group A</b> <i>Heavenly/H</i> Seed	Had spoken with potential customers, but none were using product or prototype: “[We] went to talk some people who might be customers. Then we formed.” (Founder)	Founders ready to begin building venture: “[6 months after founding] we got around a business plan and a pitch that we felt highlighted what we thought could become the company.” (Founder)	●	○	High
Series A	A potential customer used the product and felt it was complete: “We were able to build a real 1.0 product . . . and we were getting feedback [from non-paying users].” (Founder)	Preemptive structuring to synchronize w/future proofpoints: “We raised the [seed] knowing we’d do another round here [when we had a non-paying customers using the product].” (Founder)	●	●	High
Series B	A customer purchased the product: Had \$700,000 in revenue from sales of first product. “We had proven the market concept.” (Seed investor)	Preemptive structuring to synchronize w/future proofpoint: “the objective [of previously raising \$4M] was to finish off the product, launch the company, and begin to get customers in a real way.” (Founder)	●	●	High
Series C	Many customers purchased the product: “we have around 30 companies, all the top financial services companies, our average selling price is well north of \$100K, and overall its gone very well.” (Founder)	Accelerated attempt based on recent proofpoint. “We had enough proofpoints to show we had a market . . . I’m not sure that we could’ve gotten a better price two quarters from now. Maybe a year, but we would’ve needed the capital [earlier]” (Seed investor)	○	●	High
<i>Squaw/H</i> Seed	Had spoken with potential customers, but none were using product or prototype: “I talked to 15 major enterprises.” (Founder)	Founders ready to begin building venture: “Finally, [after 4 months of conferring with customers] I was ready.” (Founder)	●	○	High
Series A	Signals similar to last round: Though an initial team had been hired, no additional proofpoints were available. Used strong direct tie.	Timing around resource needs: Raised to support development team, hire CEO, and grow venture.	●	○	High
Series B	Interested customers, but none had purchased the product yet: “We had developed a pipeline of 6 very interesting customers . . . we were very confident we were going to get some of them [to sign contracts].” (Founder). Used strong direct tie.	Initiated by VC, but venture lacked proofpoint: “The issue was that [the VC] tried to do the preemptive when we just weren’t far enough along [as we didn’t have paying customers]. It was the wrong timing” (CEO)	●	○	Abandoned
Series B	A customer purchased the product: “30 days [after the prior attempt fell through] we signed [a large top-tier customer].” (Founder)	Accelerated attempt based on recent proofpoint: “We had customer data and references . . . we [would have needed] to raise within five months.” (CEO)	●	●	High

*(Continues)*

**APPENDIX B**  
**(Continued)**

Venture and Stage	Signals at Start of Round	Approaches to Timing of Seeking Tie	Strong Direct Tie	Timed around Proofpoint	Investment Tie Formation Efficiency
Series C	Many customers purchased the product: "We were a revenue company with a large marquee of reference-able accounts, growing quarter over quarter." (Founder)	Accelerated attempt based on recent proofpoint: "the market was growing aggressively . . . [also had] rosy financial projections and pretty compelling accomplishments." (Founder)	○	●	High
<i>Mammoth/H</i> Series A	Product in development, but no users: Had hired engineers (who were paid in IOUs) and had built an early technology demo.	Timing around resource needs: Started round with strong direct tie almost immediately after founding in order to stop paying employees in IOUs.	●	○	Low
Series B	A customer purchased the product: "A few months after introducing [our enterprise product], we had 5 customers." (Founder)	Accelerated attempt based on recent proofpoint. CEO wanted to "leverage momentum" of accomplishments.	○	●	High
Series C	Many customers purchased the product: Most recent quarter had over 1.5 m in sales.	Accelerated attempt based on recent proofpoint. "Market was getting taken up quickly and we wanted to step on the gas . . . we were doing really well." (Founder)	○	●	High
<i>Donner/L</i> Series A	A few early users, but users felt key features were missing: Prototypes were being used as "pilots," but they lacked "an actual deployment." (CEO)	Timing around resource needs: "We kind of knew we were too early to raise money, but it was kind of a temperature gauge at that time." (CEO)	○	○	Abandoned
Series A	A customer purchased the product: "They had the proofpoints. They had a product and the product was selling." (Investor)	Delayed until proofpoint: "We decided to delay until we developed 5 or 6 real referenceable customers." (CEO)	○	●	Moderate
<b>Group B</b> <i>Aspen/H</i> Seed	No proofpoint yet: "We had started to validate with companies." (Founder)	Timing around resource needs: "[I brought in a] well-respected management team and tried to raise as these guys wanted big bucks." (Founder)	○	○	Abandoned
Seed	A few potential customers said they would purchase the product: "Five early adopters that were good names were starting to use the [alpha] product." (Founder)	Delayed until proofpoint: Despite resource needs, had delayed because "we just needed to move the product forward." Once beta users were willing to use the product, began attempt.	○	●	High
Series A	A few potential customers used the product and felt it was complete: "It [went] from an alpha product into a 1.0 version that enterprises could use. We were getting it installed at a few companies." (Founder)	Delayed until proofpoint: "I didn't take a paycheck this entire period . . . we needed this product to be a usable enterprise product so [we'd] be able to raise some more money." (Founder)	○	●	High

*(Continues)*



**APPENDIX B  
(Continued)**

Venture and Stage	Signals at Start of Round	Approaches to Timing of Seeking Tie	Strong Direct Tie	Timed around Proofpoint	Investment Tie Formation Efficiency
Series B	A customer purchased the product: "We did \$300K in Q1 and we were showing good ramp with big customers talking of buying 6 to 7 figures of the product." (Founder)	Delayed until proofpoint: "We had missed a couple of milestones, and we had limited options without making the market feel like we were behind, so we delayed" (Founder).	○	●	High
<i>Keystone/H</i> Series A	Had spoken with potential customers, but none were using product or prototype: "A few potential customers had expressed interest in purchasing such a product."	Founders ready to begin building venture. Waited about 7 months to seek investment tie as patented technology and developed initial prototypes.	○	○	Moderate
Series B	Signals similar to last round: "Had there been that much value creation in 2-3 months [since the last round]? Of course, the answer was no." (Founder)	Initiated by VC, but venture lacked proofpoint: Founder pursued because "they offered tomorrow's price today and were very strong in internet security"	○	○	Moderate
<i>Monarch/L</i> Series A	Product in development, with no users: "We had written a first prototype and we were going to maybe start driving revenue in short order." (Founder)	Timing around resource needs. "We weren't sure what was going to happen with the venture community." (Founder)	○	○	Abandoned
Series A	A customer purchased the product: "We received our first revenue . . . [after 3 months], we were ready for prime time." (Founder)	Delayed until proofpoint: "We just kept our head down and got to the first revenue check." (Founder)	○	●	Moderate
Series B	Many customers purchased the product: Sales totaling about \$350K in recurring revenue had been made to many customers.	Accelerated attempt based on recent proofpoint. "I spent a lot of time convincing my board to not change the trajectory and to raise a fairly significant round." (Founder)	○	●	Low
Series C	More customers purchased the product: Venture had more revenue, but not a recent proofpoint.	Timing around resource needs. Founder tried preemptive structuring with prior round, but missed the timing.	○	○	Low
<i>Buttermilk/L</i> Series A	Product in development, with no users: Product was at the alpha (pre-usage) stage.	Timing around resource needs: Wanted capital to pay existing engineers and hire new ones.	○	○	Low
<i>Purgatory/L</i> Seed	Had an idea for a product, but no potential customers said they would use the product: "It was not well developed . . . just a general idea." (CEO)	Timing around resource needs. Founders sought investment tie when they had an idea and needed funds to develop it.	○	○	Low
Series A	A few early users, but users felt key features were missing: "we learned from the early [users] what would be necessary for a product."	Timing around resource needs: "We needed to boost the company to where it was ready for a market launch. So we were looking to get funding." (CEO)	○	○	Abandoned

*(Continues)*

**APPENDIX B  
(Continued)**

Venture and Stage	Signals at Start of Round	Approaches to Timing of Seeking Tie	Strong Direct Tie	Timed around Proofpoint	Investment Tie Formation Efficiency
Series A	A few early users, but users felt key features were missing: "Development was slipping." (CEO)	Timing around resource needs: Venture had only a few months of cash remaining.	○	○	Abandoned
Series A	A customer purchased the product: "this time we actually had some revenue and sales." (CEO)	Delayed until proofpoint: "the indicators were turning positive with referenceable customers . . . and some modest revenues." (CEO)	○	●	Moderate

<sup>a</sup> ● indicates that executives explicitly used an approach to ensure that formal start of the tie attempt occurred soon after a recent proofpoint; ○ indicates that executives did not time around a proofpoint.

**APPENDIX C  
Scrutinizing Interest<sup>a</sup>**

Venture and Stage	Approaches to Scrutinizing Interest	Strong Direct Tie	Scrutinizing Interest	Investment Tie Formation Efficiency
<b>Group A</b>				
<i>Heavenly/H</i>				
Seed	Strong direct tie: Founders had previously worked with target VC.	●	○	High
Series A	Strong direct tie: Founders had previously worked with target VCs.	●	○	High
Series B	Strong direct tie and direct analysis: Focused on a short list of 10 VCs some of whom had a strong direct relationship with the founders or CEO, and who were likely to be interested and were considered savvy Internet security investors. Tracked VC follow up and focused: "[it was clear] it was a great opportunity. Some were calling me more than I was calling them" (CEO).	●	●	High
Series C	Direct analysis and network verification: Focused on target VC. An existing investor probed target VC about actual interest. Also tracked behavioral cues of interest.	○	●	High
<i>Squaw/H</i>				
Seed	Strong direct tie: Founder focused on a VC who had backed him previously.	●	○	High
Series A	Strong direct tie: Founder focused on a VC who had backed him previously.	●	○	High
Series B	Strong direct tie: Once VC with strong direct tie quickly declined, founder abandoned the round.	●	○	Abandoned
Series B	Strong direct tie: Founder focused on a VC with whom CEO had previously worked, liked, and thought would be interested.	●	○	High
Series C	Network verification and direct analysis: CEO focused on "people that had expressed interest and that we kind of knew. We qualified some folks and we started working on those relationships." The CEO then used VC behavioral cues to scrutinize interest, noting that: "VCs were scheduling a single partner meeting and a full partnership meeting with mutually interested VCs" (CEO).	○	●	High
<i>Mammoth/H</i>				
Series A	Strong direct tie quickly declined, then network verification and direct analysis: After the VC from the CEO's prior venture declined to invest, approached VCs whom her lawyer believed would be both interested and likely to have good rapport with the founder. CEO then monitored how quickly VCs followed up after initial meetings and focused accordingly.	●	●	Low

*(Continues)*

**APPENDIX C**  
**(Continued)**

Venture and Stage	Approaches to Scrutinizing Interest	Strong Direct Tie	Scrutinizing Interest	Investment Tie Formation Efficiency
Series B	Network verification and direct analysis: Approached VCs who had introduced themselves to the CEO at a conference. Also approached VCs whom the lawyer believed would be interested and who were actively investing at the time. Then CEO allocated attention to VCs where the partners (and not the associates) were following up.	○	●	High
Series C	Direct analysis: Focused on VCs who had been calling the CEO to find out about the venture and whom the CEO had been casually dating.	○	●	High
<i>Donner/L</i> Series A	Indiscriminate optimism: The CEO approached 10 VCs whom he knew (though they had not previously invested in his prior venture). After numerous meetings and presentations, he abandoned the round. "If they were excited, they would have said "this looks good, I want to take it to the next level" [but that didn't happen]" (CEO).	○	○	Abandoned
Series A	Direct analysis: The CEO sought VCs whom he knew had recently invested in internet security ventures. But many of these investors did not want to make additional investments. The CEO then allocated attention based on: "the level of engagement that was happening. You can lead a horse to water but you can't make them drink" (CEO).	○	●	Moderate
<b>Group B</b> <i>Aspen/H</i> Seed	Network verification. From a list of 50 VCs to whom he could be introduced, founding CEO approached 10 whom his network contacts said were actively investing in Internet security.	○	●	Abandoned
Seed	Direct analysis: Discerned interest, noting one VC's rapid scheduling of follow-up meetings with a second partner.	○	●	High
Series A	Network verification and direct analysis: Approached VCs recommended by a VP at a more mature internet security venture as being active and interested in similar ventures. Preferred VCs to determine likely rapport. Also tracked behavioral cues like looking at whom he would be meeting with at each (VC) "you don't talk to anyone who is not a partner" (Founding CEO).	○	●	High
Series B	Direct analysis: Focused on 1 VC who had begun informal due diligence.	○	●	High
<i>Keystone/H</i> Series A	Network verification and direct analysis: After initially meeting with five local VCs (who were not interested), the founder filtered possible VCs using his network: "I would call [someone well-connected] and ask them if they had knowledge or could fish around about whether or not a firm was still doing deals." The founder also assessed interest on basis of: "the way they are talking, body language, stuff like that."	○	●	Moderate
Series B	Direct analysis: Focused on behavioral cues of VC (who preemptively approached venture) to move forward.	○	●	Moderate
<i>Monarch/L</i> Series A	Indiscriminate optimism: Approached all VCs in his local metropolitan area who were known to make early-stage investments. After meetings and presentations, the founder gave up. He said: "There was no real appetite." (Founder).	○	○	Abandoned
Series A	Indiscriminate optimism: E-mailed very many VCs on an e-mail list provided by an investment broker.	○	○	Moderate
Series B	Indiscriminate optimism. Approached about 25 VCs whom the existing investors knew and thought were likely to be interested.	○	○	Low

*(Continues)*

**APPENDIX C  
(Continued)**

Venture and Stage	Approaches to Scrutinizing Interest	Strong Direct Tie	Scrutinizing Interest	Investment Tie Formation Efficiency
Series C	Indiscriminate optimism: Continued discussions with one focal VC even after the VC repeatedly demanded substantial last-minute changes to the terms. Eventually approached four lower-tier VCs, one of whom invested.	○	○	Low
<i>Buttermilk/L</i> Series A	Indiscriminate optimism: Approached all local VCs known to make early stage investments. Then approached high-status VCs who had recently invested in Internet security ventures but did not verify interest in future investments in the sector. None moved forward.	○	○	Low
<i>Purgatory/L</i> Seed	Indiscriminate optimism: Approached all three local, early-stage VCs.	○	○	Low
Series A	Indiscriminate optimism: Approached all VCs to whom founder's existing investor could introduce him.	○	○	Abandoned
Series A	Indiscriminate optimism: Approached any VCs that he could get introduced to (around 30 total). Introductions typically came from VCs who had decided not to invest. Also went to investment conferences to attempt to meet VCs.	○	○	Abandoned
Series A	Indiscriminate optimism: Began to get introductions from technical experts who had done due diligence on the company for other VCs. Also continued to approach any VCs that he could get introductions to (many of these introductions were made by other VCs who were not interested). Continued to attend industry conferences to meet VCs.	○	○	Moderate

<sup>a</sup> ● = scrutinized professions of interest using either network verification or direct analysis of actions of investors; ○ = executives indiscriminately "shopped for ties," meeting with investors based on simplistic indicators of interest.

**APPENDIX D  
Crafting Alternatives<sup>a</sup>**

Venture and Stage	Approach to Crafting Alternatives	Strong Direct Tie	Crafted Alternatives	Investment Tie Formation Efficiency
<b>Group A</b>				
<i>Heavenly/H</i> Seed	VC with strong direct tie committed.	●	○	High
Series A	VC with strong direct tie committed.	●	○	High
Series B	Strong direct tie and structured competition: Informed 5 VCs (some with strong direct ties) doing due diligence of others' progress and set deadline.	●	●	High
Series C	Different resource path: CEO developed financial plan to enable seeking investment tie later if target VC did not immediately invest, and told VC of this plan.	○	●	High
<i>Squaw/H</i> Seed	VC with strong direct tie committed.	●	○	High
Series A	VC with strong direct tie committed.	●	○	High
Series B	Once VC with strong direct quickly declined, founder abandoned round.	●	○	Abandoned
Series B	Less-desired partners: After focusing on a VC who backed him in a prior venture, CEO approached 2 lower-tier VCs known to evaluate rapidly and they began due diligence. CEO told first VC about this.	●	●	High

(Continues)



**APPENDIX D**  
**(Continued)**

Venture and Stage	Approach to Crafting Alternatives	Strong Direct Tie	Crafted Alternatives	Investment Tie Formation Efficiency
Series C	Structured competition: After due diligence from 10 of the 15 approached VCs, CEO announced a deadline for submitting offers.	○	●	High
<i>Mammoth/H</i>				
Series A	None: Strong direct tie quickly declined. Although interest from 15 target VCs after VC with strong direct tie declined, all moved slowly and delayed until 1 made offer that was accepted. No crafted alternatives.	●	○	Low
Series B	Structured competition: Due diligence from 5 of 15 approached VCs. Founder informed each of interest and indicated likely to accept first offer. Two offers submitted simultaneously.	○	●	High
Series C	Less-desired partners: Approached 3 lower-tier VCs. After they expressed interest, went to target VCs.	○	●	High
<i>Donner/L</i>				
Series A	None: Although some interest from approached VCs, executive did not craft alternatives.	○	○	Abandoned
Series A	Initially none, eventually different resource path. Eventually created and announced bootstrap path if not funded by specific date.	○	● <sup>b</sup>	Moderate
<b>Group B</b>				
<i>Aspen/H</i>				
Seed	None: 5 of 10 approached VCs had follow-up meetings and began technical due diligence, but executive did not craft alternatives.	○	○	Abandoned
Seed	Different resource path: Announced path of family investment to be pursued after a specific date.	○	●	High
Series A	Different resource path: Informed 4 VCs conducting due diligence of commitment from existing VCs to fund if offer not forthcoming immediately and at acceptable terms.	○	●	High
Series B	Less-desired partners. After casually dating 2 desired VCs and focusing on 1, approached 3 lower-status VCs known for quick investment processes and told target VC.	○	●	High
<i>Keystone/H</i>				
Series A	Structured competition: 4 approached VCs conducted due diligence. Founder conveyed status of due diligence activities, and set a deadline for offers.	○	●	Moderate
Series B	None: Waited for VC to make an offer.	○	○	Moderate
<i>Monarch/L</i>				
Series A	None: Waited for approached investors.	○	○	Abandoned
Series A	None: Waited for 5 VCs who conducted due diligence to make an offer.	○	○	Moderate
Series B	None: Waited for 2 VCs who conducted due diligence to make an offer.	○	○	Low
Series C	Initially none, eventually less-desired partners: Waited for desired VC (of unclear interest) to commit, then went to 4 less-desired VCs. Desired VC was not induced, but a less-desired VC made an offer.	○	● <sup>b</sup>	Low
<i>Buttermilk/L</i>				
Series A	None: Waited for 1 interested VC to evaluate venture and make an offer.	○	○	Low
<i>Purgatory/L</i>				
Seed	None: Waited for 1 interested VC to make an offer.	○	○	Low
Series A	None, although misused creating alternatives: Founder "tried to create impression of scarcity but did not mention explicitly who was interested." Potential investors were not induced.	○	○	Abandoned

*(Continues)*

**APPENDIX D  
(Continued)**

Venture and Stage	Approach to Crafting Alternatives	Strong Direct Tie	Crafted Alternatives	Investment Tie Formation Efficiency
Series A	None: Several investors continued to meet with the CEO, but CEO did not craft alternatives.	○	○	Abandoned
Series A	Initially none, eventually structured competition: Eventually told 6 interested investors of competition.	○	● <sup>b</sup>	Moderate

<sup>a</sup> ● = executive developed multiple routes to end tie formation process; ○ = multiple routes not developed or not developed early.

<sup>b</sup> Venture executives could have used crafting alternatives much sooner in the tie formation process than they did.

**APPENDIX E  
Role of Initial and Other Early Investors**

Venture and Stage	Role of Existing Investors in Current Round	Maximum Status of Prior Investors <sup>a</sup>	Due Diligence of Targeted Investor(s) <sup>b</sup>	Outcome Summary
<b>Group A</b>				
<i>Heavenly/H</i>				
Seed	No prior VC investors			Accepted offer from 1 VC.
Series A	Initial VC not actively involved; Founders used own strong direct ties to approach 2 target VCs	Top 5%	All VCs had begun initial meetings.	Accepted offer from 1 VC; others still doing due diligence.
Series B	Initial VC provided introductions to 4 of 10 targeted VCs. Founders and CEO had strong direct ties to others.	Top 5%	All VCs had a handful of meetings.	Accepted offer from 1 VC with strong direct tie to CEO; 4 other offers.
Series C	Initial VC provided introduction to the target VC.	Top 5%	Introduced VC had a series of meetings and conducted technical due diligence.	Accepted offer from 1 introduced VC.
<i>Squaw/H</i>				
Seed	No prior VC investors			Accepted offer from 1 VC.
Series A	Founders used own strong direct tie to approach target VC. First investor not actively involved.	Top 25%	VC had a series of meetings with executives.	Accepted offer from 1 VC.
Series B	Founder had a strong direct tie with VC who had approached Founder. Early VCs not actively involved.	Top 5%	VC had a series of meetings and conducted technical and customer due diligence.	Abandoned as VC backed out.
Series B	CEO had strong direct tie to primary target VC. Later approached 3 backup VCs. Early VCs not actively involved.	Top 5%	Target VC had a series of meetings and conducted due diligence. All backup VCs had a few meetings.	Accepted offer from 1 target VC; others still doing due diligence.
Series C	Early VCs provided introductions to handful of 15 target VCs. Founder and CEO had weak ties to others.	Top 5%	Many VCs (including introduced VCs) had a series of meetings and conducted customer due diligence.	Accepted offer from 1 introduced VC; 5 other offers.
<i>Mammoth/H</i>				
Series A	No prior VC investors			Accepted offer of 1 VC.
Series B	Initial VC provided introduction to 1 of 9 target VCs. Founder had weak ties to others.	Top 5%	Several VCs (including introduced VC) had a series of meetings and conducted sales pipeline and customer due diligence.	Accepted offer from 1 VC; 1 other offer; others (including introduced VC) still doing due diligence.
Series C	Early VCs not involved.	Top 5%	All VCs had initial meetings.	Accepted offer of 1 VC; other still doing due diligence.
<i>Donner/L</i>				
Series A	No prior VC investors			Abandoned.

*(Continues)*

**APPENDIX E**  
**(Continued)**

Venture and Stage	Role of Existing Investors in Current Round	Maximum Status of Prior Investors <sup>a</sup>	Due Diligence of Targeted Investor(s) <sup>b</sup>	Outcome Summary
Series A	No prior VC investors			Accepted offers of 3 VCs; 4 other offers.
<b>Group B</b>				
<i>Aspen/H</i>				
Series A	No prior VC investors			Abandoned without offers.
Seed	No prior VC investors			Accepted offer from 1 VC; others still doing due diligence.
Series A	Initial VC provided introductions to several 10 targeted VCs. Founder had weak or indirect ties to others.	Top 10%	Many VCs had a series of meetings, and several (including introduced VCs) conducted technical and customer due diligence.	Accepted offer from 1 introduced VC; others still doing due diligence.
Series B	Early VCs provided introductions to 1 target VC and 2 lower-tier VCs. Founder had weak ties to others, 1 of whom approached founder and was a target. Founder casually dated both target VCs.	Top 5%	All VCs had a series of meetings, and several (including three introduced VCs) conducted due diligence.	Accepted offer from 1 introduced VC; other still doing due diligence.
<i>Keystone/H</i>				
Series A	No prior VC investors			Accepted offers from 3 VCs.
Series B	Venture approached by desirable VC.	Top 5%	VC had a series of meetings and conducted technical due diligence.	Accepted offer from 1 VC.
<i>Monarch/L</i>				
Series A	No prior VC investors			Abandoned.
Series A	No prior VC investors			Accepted offers from 3 VCs; others still doing due diligence.
Series B	Initial VCs provided introductions to many of 30 target VCs. Founder had indirect ties to others.	Top 5%	Many VCs had a series of meetings, and 2 introduced VCs conducted customer due diligence.	Accepted offers from 1 introduced VC.
Series C	Initial VCs provided introduction to 1 of 5 approached VCs. Founder had weak or indirect ties to others.	Top 5%	Most VCs (including introduced VC) had a series of meetings and conducted due diligence.	Accepted offer from 1 (non-introduced) VC.
<i>Buttermilk/L</i>				
Series A	No prior VC investors			Accepted offer from 1 VC.
<i>Purgatory/L</i>				
Seed	No prior VC investors			Accepted offer from 1 VC.
Series A	Initial VC provided introductions to some of roughly 60 target VCs. Founder had weak or indirect ties to others.	Top 25%	Many VCs (including introduced VCs) had a series of meetings, and several conducted technical due diligence.	Abandoned.
Series A	Initial VC provided introductions to some of roughly 30 target VCs. Founder had weak or indirect ties to others.	Top 25%	Many VCs had a series of meetings, and several conducted technical and industry due diligence.	Abandoned.
Series A	Initial VC provided introductions to some of roughly 30 target VCs. Founder had weak or indirect ties to others.	Top 25%	Many VCs had a series of meetings, and several conducted technical and customer due diligence.	Accepted offers from 2 VCs, others still doing due diligence.

<sup>a</sup> Status determined on the basis of eigenvector centrality in the 2003 syndication network using data from VentureXpert. Status is listed at the following thresholds: Top 5%, Top 10%, and Top 25%.

<sup>b</sup> Unless otherwise noted, all meetings are between target VCs and the executives.



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