The Dynamics of Strategic Relationships Across New Product Development

T.J. WEITEN

University of Washington

Abstract

Firms spend over $400 billion a year in the U.S. alone on research and development for new products. Frequently, firms form strategic alliances to receive tacit knowledge and valuable resources that other firms possess, which are necessary in the development of new products. This work builds on our understanding of relational resources as they pertain to innovation success in the strategic alliance context. We discuss the dynamics of the new product development process as they are pertinent to strategic relationships the firm forms, particularly in the front-end of innovation. We then conceptualize a model of dyadic alliance performance dependent on the trust between two partners. We discuss two potentially moderating factors that impact the effectiveness of trust on cocreating alliance value: the phase of the innovation process the partner is involved in and the dynamic nature of the industry of which the alliance pertains. We find initial supporting evidence that early-involvement in the new product development process and highly dynamic markets exacerbate the issues of structural rigidity and overembeddedness on cocreated alliance value for high trust partners. Theoretical and managerial implications are given, and suggestions for future empirical research is discussed.

Introduction

New Product Development (NPD) is an undeniably important source of competitive advantage for firms and a necessary driver of firm performance. It is estimated that firms in the United States spend over $400 billion a year on research and development (OECD, 2017). Yet despite the importance of a comprehensive understanding of innovation, little research has explored how relational resources can impact innovation success (Kozlenkova, Samaha, & Palmatier, 2014). Specifically, a comprehensive understanding of the dynamic effects of relationships on new product development remains under-researched. Relationship marketing, defined as "all marketing activities directed towards establishing, developing, and maintaining successful relational exchanges," has become increasingly focused upon by both managers and academicians alike in recent years, both in the B2B and B2C spaces (Morgan & Hunt, 1994, p. 22). Evidence suggests firms spend in excess of over $12 billion a year on relationship marketing strategies, attempting to successfully manage relationships (Gartner Research, 2013).

Relationships are also intrinsic to innovation. No firm can innovate alone, and firms participating in both radical and incremental innovation and new product development must form relationships, both with other business partners (i.e. suppliers and manufacturers) and consumers. Because of the difficultly in innovating and the potential benefits of external knowledge, many firms form strategic alliances to gain access to valuable resources. A recent Harvard Business Review (2017) article underlines the importance of relationships in new product development:

> The fact is, going it alone, we believe, is simply not the way to go at all. **Collaboration is the essential new secret sauce** for startups and industry leaders alike. For true disruption to take hold, old and new must work together, playing to each other's strengths.

In other words, firms must align with one another to seek out their specialized knowledge and unique resources, thus aiding in the creation of innovative new products.

Examining new product development without accounting for the dynamics of the process would ignore an extremely important part of the innovation phenomenon. Firms maintain specific procedures for their new product development activities that give structure to the process, facilitating the development of new ideas. Indeed, the most prominent models of NPD are stage models that explicitly analyze how innovation efforts unfold over time. Hence, research into how relational resources play into new product development must also look towards these dynamic effects. *Thus, the purpose of this paper is to begin work toward gaining a greater understanding into how relationships play a role throughout the dynamic process of new product development.*

Overview of Stage Models of NPD

In order to facilitate new product development, firms typically employ some form of structured process to ensure that new ideas are generated and the best potential products progress to the market. These "Idea-to-Launch" innovation processes guide firms through creating new products and services, from how to generate ideas to the commercialization and launch of the new product. Conceived out of a need to reduce the cost, time, and uncertainty in new product development, the Stage-Gate® system is the most commonly used new product development management process. While many firms customize the Stage-Gate process in some way to fit their needs, the overarching idea remains consistent.

In essence, the Stage-Gate method and its derivatives work as a funnel, leading the best ideas to their eventual launch, while killing less successful projects before they waste substantial resources. As its name might suggest, this funnel process is achieved by having several stages of the innovation process separated by gates. At each stage, various activities are undertaken by the innovating firm, ranging from preliminary investigation and scoping of the project to product trials and eventually launch and commercialization. In between each of these stages lie the gates—reviews where stakeholders analyze the projects in the pipeline and issue Go/Kill decisions based on varied criteria. Projects that survive the gate move onto the next stage, while projects that are killed end up either retooled or shelved. By killing projects that are deemed to have little viability before expensive development resources are granted to them firms save money and time that allow for the new product development process to benefit from greater success rates and speeds. In the upcoming paragraphs, we'll quickly outline the "standard" Stage-Gate model as given by Cooper (2004, 2008, 2009, 2011).

The Stage-Gate process begins with the generation of ideas. This stage encompasses what is often referred to as the Front End of Innovation or the Fuzzy Front End. The Front End of Innovation is set up to facilitate ideation programs, both internally within the firm and externally with a firm's partners and customers. This process of discovery leads to what is referred to as Stage 1, or the *scoping stage*, where some quick and inexpensive preliminary investigation into the viability of the project is conducted. For projects that pass this preliminary investigation stage, Stage 2, or *building the business case*, sees to the construction of a thorough justification for allocating resources to developing the project. In other words, a mixture of primary customer, market, and technical research is

conducted to elucidate a precise definition of the project, justify the resources, and plan how it will be achieved. The gate proceeding this stage is particularly important because it marks the last point before costly developmental resources will be put towards the project. Subsequently, those projects that pass this gate move into Stage 3, or the *development* stage. Throughout the development stage, checkups ensure that the project is coming along according to plan, with failures to meet ongoing reviews leading to possible project terminations. Assuming the project makes it through the development process, it is now tested in Stage 4 to *verify and validate* against the plans set (from marketing to production and operations) out in previous stages. Finally, projects move to the *commercialization stage* where the product is launched and production, marketing, and sales begin.

Other researchers have described their own variants of Stage-Gate for different contexts such as Technology Stage-Gate (TechSG) and the Accelerated Radical Innovation model (Ajamian & Koen, 2002; Bers, Dismukes, Mehserle, & Rowe, 2014). Most recently, Stage-Gate has been looked at as a combination of hybrid models such as the Agile–Stage-Gate model (Cooper & Sommer, 2016). Nevertheless, the Stage-Gate concept has become a dominant force in the new product development process literature and is heavily utilized by firms. Estimates suggest that some form of Stage-Gate process is utilized to manage new product development at over 80% of firms (Edgett, 2015).

The Importance of the Front End of Innovation

Insofar as relationship issues may be important in new product development, we suspect that the earliest stages of NPD may be the most susceptible to relationship factors. Hence, a brief review of research and theory on the front end of the NPD process seems

pertinent. Before any formal development of a new product or service can begin, the firm must first outline what the project entails. This process includes activities such as technical viability work, product concept work, initial market research, and business case preparation (Markham, Ward, Aiman-Smith, & Kingon, 2010). The Front End of Innovation, also known sometimes as the Fuzzy Front End due to its purportedly nebulous nature, is defined as the collection of activities conducted before entering the structured new product development process (Koen et al., 2001).

The front end of innovation is considered to be one of the most crucial steps in the creation of value for new products (Koen et al., 2001; Markham, 2013). Smith and Reinertsen (1992) argue that providing more attention to the front end of innovation will improve product performance the most at the lowest cost. Reflecting this thinking, research suggests that approximately 78% of firms use some front-end process, be it formal (33%) or informal (45%) (Markham et al., 2010). However, despite its importance, the Front End of Innovation remains substantially under-researched (Koen, Bertels, & Kleinschmidt, 2014a).

New Concept Development Model of the Front-End. The original stage-gate theory had relatively little to say about the Front End of Innovation. One of the first attempts to foster some common language and understanding on the Front End of Innovation, its activities, and its structure was authored by Koen et al. (2001). Their model consists of three main components. The first is the *five key elements* of the front end of innovation. These are the activities a firm undertakes during the front-end phase, including idea genesis, idea

selection, concept & technology development, opportunity identification, and opportunity analysis.

Opportunity identification is a strategic element where the firm identifies the opportunities it wishes to pursue. Since simply identifying opportunities is typically not sufficient, *opportunity analysis* is where additional information is gathered and assessed. Depending on how lucrative an opportunity seems and its fit with the firm, the extensiveness of activities conducted (e.g. focus groups, market studies, scientific experiments) in the opportunity analysis element will vary. *Idea genesis* refers to the development of concrete new ideas. It is described as an evolutionary process in which "ideas are built upon, torn down, combined, reshaped, modified, and upgraded" (Koen et al., 2001, pp. 50-51). It involves direct contact with customers, cross-functional teams, and other firms and institutions. It may be formal, through activities such as brainstorming sessions and idea banks, or informal, through happenstance events. Obviously, this element of the innovation process depends on mining information from the matrix of B2B and B2C relationships maintained by a firm.

Because firms typically generate many more new ideas than they could (or should) possibly develop, *idea selection* narrows down the set of potential new products to the most valuable. Importantly, both idea selection and opportunity analysis should be less rigorous and stringent in the front-end. Overly zealous selection and analysis can eliminate ideas with unrecognized potential before they can grow. *Concept and technology development* (called *concept definition* in Koen et al. (2014a)) involves "the development of a business case based on estimates of market potential, customer needs, investment

requirements, competitor assessments, technology unknowns, and overall project risk" (Koen et al., 2001, p. 51). Since the construction of a business case follows this element, concept and technology development is one of the final processes before moving out of the front-end and into the structured new product development process.

Firms may utilize one or more of these key elements and may use a single element more than once. Hence, the Front End of Innovation is considered highly nonlinear in nature because firms flow through these processes as needed instead of in a structured way (Koen et al., 2001). The other two main components of the Koen et al (2001) model are *the engine,* or the leadership and culture in a firm, and the *influencing factors,* or the environment the firm is in. The leadership and culture of an organization is important to the Front End of Innovation because they fuel the five key elements. Finally, the environment of the firm influences the whole innovation process. In other words, organizational capabilities, business strategy, and the greater outside world of channels, customers, and competitors impact how the five key elements unfold. Clearly, the influencing factors include a variety of forces that revolve around a firm's relationships with other companies and its customers.

The New Concept Development model has been expanded and refined by Koen, Bertels, and Kleinschmidt (2014a, 2014b). One focus of their research has been to contrast how firms might undertake different activities in the front-end for incremental and radical innovation projects (2014b). Specifically, they estimated which constructs in their model contribute the most to innovation performance, for both incremental and radical project activity, in the front-end. For incremental innovation, opportunity identification and

opportunity analysis were the most significant factors in influencing front-end performance. However, in the case of radical innovation, Koen et al. (2014b) highlight the importance of focusing on opportunity generation amongst industry trends and disruptive business ideas, along with idea generation focused on new technologies. In other words, for radical innovations, it is most important for the firm to understand their potentially disruptive markets and learn how to leverage new technologies.

Boundary Spanning Model of the Front-End. A second model developed by Reid and de Brentani (2004) suggested a more structured process (with a more concrete ordering of the front-end activities) than Koen et al. (2001) for the Front End of Innovation, particularly for radical innovations, or what they call discontinuous innovations. For incremental innovations, they posit that organizations lead the search for problems and new opportunities, directing the individuals to search for supporting information. But in the case of radical innovation, information is sought after by individuals, without explicit direction by the organization. Thus, in their boundary spanning model, which focuses on the case of radical innovation, information flows from the environment into the firm. Individuals known as *boundary spanners* interface with the outside environment and internal organization. The boundary spanning individual recognizes recurring elements in the environment and discerns unaddressed market needs and innovative technology paths. The boundary spanner then builds these observations into new organizational knowledge by identifying its existence and classifying its content. This process is known as the boundary interface.

Following the synthesis of information from the environment, boundary spanners then interact with the *gatekeepers* in an organization. It is the role of the gatekeepers to evaluate the information brought in by the boundary spanner. That is, the gatekeepers determine if the new information is relevant to the organization. The gatekeeping interface marks the delineation between gatekeepers and corporate-level decision-makers and small teams of individuals operating at the product level. The final interface described in Reid and de Brentani (2004)'s boundary spanning model sits between the corporate-level decision-makers (renamed as project brokers in de Brentani and Reid (2012)) and the project-level decision-makers. Coined the project interface, this final interface links the firm to the project. In essence, through the ideas forwarded by the gatekeepers, the corporate-level decision-makers integrate this new information into the new product development strategy of the organization. Reid and de Brentani (2004) stress that for the discontinuous case, their model proposes the opposite ordering of front-end activities from other models (Cooper, 1990; Griffin, 1997). That is, other models previously had recommended moving from organizational strategy to idea generation. However, in the boundary spanning model, idea generation is an ongoing process at the individual level, spurred by information from the environment and processing it through various interfaces until it develops into a "strategic web" at the firm.

In a followup study, de Brentani and Reid (2012) refined their model and tested several propositions regarding the effectiveness of individual decision makers in bringing about effective flow of information. They posit characteristics of boundary spanners that allow them to be more efficient at acting as a channel of information into the firm. Social network analysis identified three key factors influencing boundary spanner effectiveness.

First, characteristics of the innovation project can affect boundary spanner efficacy. Essentially, for projects that are more radically innovative, or situations where information in the environment is received and unevenly distributed over time, boundary spanners will be less effective at their role of bringing information into the firm. Second, the position of the boundary spanner in the internal firm and external network impacts efficacy. de Brentani and Reid assert that a greater degree of breadth and centrality (more connections and connections that are central to the development of new technology) while having a lower degree of cohesion (nonredundant contacts) has a positive impact on efficacy. Finally, a boundary spanner's efficacy is impacted by their latent ability to perceive or recognize salient data or information in their environment. Although much remains to be learned about how boundary spanners contribute to innovation, the nature of the concept is inherently relational, suggesting once again that relationship factors may make fundamental contributions to new product development.

Stage-Gate in the Front-End. While the bulk of the Stage-Gate process takes place after the Front-End of Innovation, activities conducted in the front-end are vital to the success of an innovation project. While earlier versions of the Stage-Gate model, as described by Cooper, did not discuss the front end in depth (in fact, Cooper admits that he treated it as a light bulb in the model), updated versions of Stage-Gate focus on this Discovery step as one of the most critical (Cooper, 2011, p. 157).

In the revised model, the ideation process can be broken into three categories of methods utilized: voice-of-customer, open innovation, and other methods. In Cooper and Edgett (2008)'s study on ideation, nearly all of the most effective forms of ideation related

to the voice-of-customer. However, many of these most effective methods were underutilized by innovating firms. For example, ethnographies were rated as the most effective method for ideation, but only about 13% of innovating firms utilized the method (Cooper & Edgett, 2008). Of the voice-of-customer methods, Cooper and Edgett (2008) identify eight activities as the most effective (ranked from most effective to least): ethnographic research, customer visit teams, customer focus groups, lead user analysis, customer or user designs, customer brainstorming, customer advisory board/panel, and a community of enthusiasts. Most of these methods leverage firms' relationships.

Cooper and Edgett (2008) only identify one moderately effective open innovation method. The most effective method from this type of activity is to solicit ideas and suggestions from outside partners and vendors. Because a firm's partners and vendors are unlikely to have exactly the same expertise as one's own firm, partners and vendors can often offer insights and aid in ideation. However, partners don't always have creative ideas themselves, and thus their recommendations may not be ideal. Other open innovation methods typically scored poorly on Cooper and Edgett (2008)'s effectiveness scale.

Finally, Cooper and Edgett (2008) discuss other ideation methods that do not fall into voice-of-customer or open innovation categories. These include looking into your peripheral vision, monitoring disruptive technologies, patent mapping, and capturing ideas internally. All four of these methods are identified as moderately effective (around as effective as the least effective voice-of-customer methods) but are used extensively by many firms.

The Boundary Spanning Model, the New Concept Development Model, and the expanded Stage-Gate model analyze the front end of the innovation process in very different ways, but all three models share one major theme. Each one highlights the potential importance of relationship factors which may fuel or perhaps thwart new product development. Thus, we believe that interface between the domains of relationship marketing and new product development may be an overlooked area for future research.

Study 1: Event Study Analysis on Cocreated Alliance Value

In our first attempt to explore this interface we chose to focus on a widely-consulted database that catalogs strategic alliances in the world of business, SDC Platinum. This dataset captures publicly made strategic alliance announcements and various intelligence around them. We utilize this set of alliance announcements to focus on a crucial aspect of interfirm relationships, most notably interfirm trust.

The Role of Strategic Alliances

Two theoretical perspectives dominate the strategic alliance literature: the resource-based view and knowledge-based view. At the core of the resource-based view is the idea of competitive advantages, or when a firm can make more economic value than a marginal competitor in the market (Barney, 1991). Specifically, sustainable competitive advantages lead to firms creating more value than the marginal firm and its benefits are not possible to duplicate. It is a firm's resources that allow them to create these sustainable competitive advantages. Some firms are better than others at accomplishing certain activities (resource heterogeneity) and these resources may not be tradeable to other firms (resource immobility). Integrating alliance relationships into the resource-based

framework, alliances allow firms to access other firms' valuable resources that may provide a sustainable competitive advantage in the development of new products.

The other major perspective on strategic alliances is the knowledge-based view. This view is similar to that of the resource-based view, but posits that firm knowledge, specifically, is the most important source of sustainable competitive advantage (Eisenhardt & Santos, 2002). Its key proposition is that access to tacit external knowledge is the key reason why firms form strategic alliances (Grant & Baden-Fuller, 2004). Tacit knowledge is knowledge that cannot be easily codified, duplicated, or shared across business units. A strong network of alliances provides a great amount of tacit knowledge, which can easily turn into a powerful competitive advantage for a firm.

In the context of new product development, alliances are well regarded to provide substantial knowledge and resources. As successful innovation requires the integration of dissimilar yet complementary knowledge and resources from different areas (e.g. technical, market, and design knowledge), strategic alliances can fill the holes in a firm's knowledge portfolio and allow for successful innovation (Cohen & Levinthal, 2000).

Trust: Both a Positive & Negative

Perhaps the most influential publication in the relationship marketing literature was that of Morgan and Hunt (1994). Morgan and Hunt propose both trust and commitment as key-mediating variables in the relationship marketing framework. They state that commitment and trust are key because they encourage marketers, among other things, to work at preserving relationship investments by cooperating with exchange partners, resist attractive short-term alternatives in favor of the expected long-term

benefits (i.e. it discourages opportunistic behavior), and view potentially high-risk action as being prudent because the other party is, too, discouraged from opportunistic behaviors. Within their model, trust also has its own direct impact of commitment. Commitment increases acquiescence and cooperating, while it decreases the propensity to leave. Trust, additionally, increases cooperation and functional conflict, while it decreases uncertainty.

Since Morgan and Hunt's (1994) influential analysis, relationship marketing literature has relied heavily on the conceptualization of trust. Trust itself is often placed in the context of the resource-based view. Specifically, the relationships firms form with high degrees of trust cannot be easily duplicated and confer many benefits, such as lowering transaction costs, facilitating investments into further relational assets, and superior information-sharing routines (Zaheer, McEvily, & Perrone, 1998). In one study, trusted partners incurred lower transaction costs because they spent less time debating problems, monitoring each other, and enforcing agreements, thus increasing performance because monitoring and safeguarding are nonproductive activities (Dyer & Chu, 2003). Additionally, trust has a positive impact on performance as it encourages partners to become more productive with one another, sharing tacit knowledge and committing to collective efforts (McEvily, Perrone, & Zaheer, 2003).

Yet while trust has generally been shown to have a net positive impact on innovation performance, it is not without the potential for downsides. Two often addressed downsides of enhanced trust include increased structural rigidity, the scenario where the firm becomes less responsive and open to change, and overembeddedness, the scenario where the firm no longer actively seeks out new partnerships. Gargiulo and Benassi (2000)

use structural hole theory to demonstrate how relational bonds filter external information and generate a cognitive lock-in that isolates the bonded partners from the outside environment (Grabher, 1993). As trust increases, routines lock in as there is less of a need to monitor your partner, hence causing structural rigidity. This rigidity creates an inertia towards environmental scanning and impedes the redeployment of resources quickly in the case of dynamic environments.

Simultaneously, research on organizational coupling has shown that tight coupling (in our case because of high trust) leads to cliques which reduces the flow of nonredundant information (Meyer, DeTore, Siegel, & Curley, 1992). This in turn leads to network inertia, where firms are unwilling to seek out new partners that are potentially better equipped for performing the task at hand (Adler & Kwon, 2002; Meyer et al., 1992). Such a situation is referred to as overembeddedness (Hagedoorn & Frankort, 2008).

Thus, high versus low trust between firms in a business alliance may have varied effects on the process of new product development. Moreover, the impact of high trust may depend on whether a new product is in the early or late stages of development.

Dynamism in NPD

Dynamism, in the context of new product development, will represent the effects of external environmental changes. We define dynamism in our context as the rapidity and unpredictability in which the industry demand is changing (Kohli & Jaworski, 1990). As such, a highly dynamic environment is one characterized by rapid and unpredictable changes in customer needs and technologies. These kinds of dynamic environments (vs. stable environments) require greater degrees of adaptability and swift strategic decision

making by the firm. In industries that exhibit dynamism, constant changes to technologies, markets, and competition force high-level managers to make continual rapid-fire adjustments to their strategic decisions in order to cope with the rapidly changing environment (Hitt, Keats, & DeMarie, 1998).

Conceptual Model

We begin the discussion of our conceptual model with trust. As discussed previously, trust has generally been shown to have a positive link between two partners, enhancing overall performance. Specifically, as McEvily et al. (2003) show, enhanced trust encourages partners to share more tacit knowledge amongst one another and commit to greater collective efforts. In the case of innovation, we believe that trust increases the likelihood of partners sharing tacit knowledge that can be used early on in the ideation phase or later on in the development phase. Additionally, trust will actively encourage the two partners to actively cooperate on the development of the new product and reduce time spent with unproductive activities such as monitoring, debating, and enforcing agreements that take away from the ability for two firms to collaborate on innovation (Dyer & Chu, 2003). Thus, we posit the following hypothesis:

H1A: Trust contains a positive component enhancing firm financial performance.

However, as we additionally detailed early, trust does not exclusively have positive effects. Specifically, trust has been shown to increase both structural rigidity, whereby the two partners become less responsive due to a lack of necessity in monitoring one another and scanning their external environment, and overembeddedness, whereby the partners no longer feel it necessary to seek our new partners and relationships that may have potentially novel and important information to the innovation process. Thus, due to

enhanced structural rigidity and overembeddedness, trust will also have a negative component that harms overall firm financial performance. Specifically, we posit this in our second hypothesis:

H1B: Trust contains a negative component diminishing firm financial performance.

Engaging the dynamic aspect of new product development, we look to whether the firm is involved with products that are both early and/or late in development. As mentioned previously, the front end of innovation is a difficult task that requires extensive searching of external knowledge on customer needs and technological trends, along with ideation from both inside and outside the organization. As such, early involvement in the innovation process will likely exacerbate structural rigidity and overembeddedness' negative effects on firm financial performance. Specifically, with higher amounts of rigidity come an innate inertia towards thinking "outside the box." In a phase of innovation characterized by the discovery of novel ideas, any stifling of creativity will lead to a negative impact on performance. Secondly, the ideation process requires utilizing boundary spanners that search the external environment for important customer information and technological evolutions. With greater degrees of trust, firms are unwilling to seek out new partners that may possess unique and novel knowledge required for ideation. Thus, in summary, early involvement in the NPD process will cause the negative components of trust to be exacerbated. Specifically, we posit the hypothesis that:

H2: Early involvement in the innovation process exacerbates the negative component of trust on firm financial performance.

We finally round out our conceptual model with a discussion of the dynamic nature of an industry and its interaction with trust. As noted previously, dynamic environments

are characterized by rapid and unpredictable changes in customer needs and technological advancement. Such rapid changes require senior management to respond swiftly and frequently to environmental changes. However, as discussed, structural rigidity and overembeddedness inherently preclude rapid responsiveness. Specifically, structural rigidity slows down the responsiveness of firms to a great degree, as routines have already developed. Overembeddedness prevents firms from seeking out new partners that have novel information about how customer needs or technology in the industry has changed. Thus, highly dynamic environments are likely to exacerbate the downside of trust on financial performance. Specifically, we posit that:

H3: Highly dynamic industry environments exacerbate the negative component of trust on firm financial performance.

The overall conceptual model and its hypotheses are illustrated diagrammatically in Figure 1.

Insert Figure 1 Near Here

Methodology

Sample

We test our hypotheses using a data set featuring strategic alliance announcements. Firms come from a diverse range of industries. We identify our selected alliance partners by using the Joint Venture/Strategic Alliances database on SDC Platinum. We then further complement our data with information from multiple archival sources, such as the Center for Research in Security Prices (CRSP), COMPUTSTAT Industrial Annual database, and press release announcements.

We define our final sample by first taking firms that formed strategic alliances between 1998 and 2014. We then limit our dataset to dyadic alliance announcements that involve only two parties. Finally, because we want archival data on both firms in the strategic alliance, we limit our sample to publicly traded, U.S.-based firms. After eliminating alliance announcements for which we were missing information in some form (e.g. missing the identifier necessary for retrieving information from CRSP, matching information from CRSP to COMPUSTAT, missing press releases, etc.), we are left with 183 strategic alliance announcements between 1998 and 2013, which includes 366 individual firm returns.

Insert Figure 2 Near Here

Estimation Model

Event studies work off the assumption given by the efficient market hypothesis that at any single point in time a firm's stock price fully reflects all information up to that point in time (Fama, 1998; Sharpe, 1964). Hence, it is viewed that any change to a firm's stock price as a result of new information is reflected by investors' present valuation of the firm and their expectations for future profits. Therefore, the market return due to an event is the market return unexplained by what their expected return should have been. This difference between actual and expected market returns is called an abnormal return. In the following section, we discuss how abnormal returns are calculated and how they are utilized in the testing of our hypotheses.

Measures & Operationalizations

Cocreated Alliance Value. Abnormal returns as discussed above are estimated by using the Fama-French 3-factor model (Fama & French, 1993) in addition to Carhart's momentum factor (Carhart, 1997). This model is considered a relatively good benchmark for normal

returns to a stock. The three factors include the traditional capital asset pricing model (CAPM) factor of market portfolio, in addition to market capitalization and market value. The additional momentum factor proposed by Carhart accounts for the persistence effect in returns as reported by Jegadeesh and Titman (Jegadeesh & Titman, 1993). Thus, our combined Fama-French-Momentum 4-factor model (FFM4) is given by the equation…

$$R_{it} - R_{ft} = \alpha_i + \beta_{1i}\left(R_{mt} - R_{ft}\right) + \beta_{2i}SMB_t + \beta_{3i}HML_i + \beta_{4i}UMD_i + \varepsilon_{it} \quad (1)$$

$$E[\varepsilon_{it}] = 0; \quad Var[\varepsilon_{it}] = \sigma_{\varepsilon_i}^2$$

where

t: Subscript for time relative to the date of the alliance announcement, such that -250 $\leqslant$ t $\leqslant$ -10

i: Subscript for firm in a strategic alliance announcement

R_{it}: Returns to alliance announcement *i* on day *t*

R_m: Value-weighted return of all CRSP firms incorporated in the US and listed on the NYSE, AMEX, or NASDAQ under certain conditions

R_f: One-month treasury bill rate, or the theoretical rate of return of an investment with no risk

SMB: The average return on the three small portfolios minus the average return on the three big portfolios

HML: The average return on the two value portfolios minus the average return on the two growth portfolios

UMD: The average return on the two high prior return portfolios minus the average return on the two low prior return portfolios

Additionally, ε_{it} is the disturbance term and $\alpha_i, \beta_{1i}, \beta_{2i}, \beta_{3i}, \beta_{4i}$, and σ^2 are the parameters of the model being estimated. Using Equation (1), we estimate expected returns using an estimation window of a trading year prior to one week before the alliance announcement. Therefore, our estimation window consists from 250 days to 10 days prior to the alliance announcement event.

After normal returns are estimated, we compute the estimated abnormal returns as the difference between the actual return minus the expected return. This formula captures returns unexplainable above and beyond normal returns except by the event's occurrence. More formally, this equation is given by…

$$AR_{it} = R_{it} - E[R_{it}] \quad (2)$$

where AR_{it} is the abnormal return, R_{it} is the actual return, and $E[R_{it}]$ is the estimated return calculated using Equation (1). We calculate abnormal returns for the day of the alliance announcement and for a period of four days after.

Following this, we compute the cumulative abnormal returns as…

$$CAR_i = \sum_{t=t_{-1}}^{t=t_1} AR_{it} \quad (3)$$

where CAR_i is the cumulative abnormal return, t_{-1} represents the day before the event, t_1 represents the last date in the event window, and AR_{it} is the abnormal return for an alliance announcement at time *t*. Finally, we sum both firms in the strategic alliance's CAR_i's for a measure of cocreated alliance value.

Trust. In this study, we operationalize trust through the overlap in the two firm's industries. Specifically, we suggest that when a firm shares its primary 2-digit SIC code with that of its partner, inherent trust in the relationship is overall lower than if they do not

share a 2-digit SIC code because the two firms do not compete with one another. While this measure abstracts away many aspects of relational growth, invariably in the transfer of important tacit knowledge and resources, high competitiveness will lead to increased inertia from sharing potentially useful information with a firm which may be able to leverage it against its partner. Hence when allied firms do not have any overlap in their SIC, their business units are more separated and tacit knowledge can be more safely shared.

Early/Late-Involvement Activities. Early or late involvement in the new product development process is codified in our paper off of strategic alliance announcement press releases. For each alliance announcement in our dataset, we identify the relevant public press release for the event. For early involvement in the new product development process, we first look for the presence of a specific product that is being developed. We first check to ensure the press release describes some transfer of a technology or competency amongst the partners. In the unlikely event that the firms do not describe the transfer of a valuable resource or tacit knowledge, it is dropped from the analysis. If the press release does describe the transfer of a valuable resource of tacit knowledge, then coding it as early or late-involvement follows a few specific steps.

First, if the press release details the integration of tacit knowledge or resource into an existing product or service as a value-added feature, it is considered to be a late-involvement activity. Second, we look at whether the tacit knowledge or resource is going to be explicitly used in the creation of a mentioned new product or service. If the technology is not expressly swapped to be included in new product development, then it is likely the firm is acquiring patents for the sake of building a portfolio that they may potentially work with. Alexy, Criscuolo, and Salter (2009) describes how firms should form

strategic alliances to acquire the access to potentially useful patents in their future development activities, but should only actively use them once they've confirmed they have the resources to exploit them later on. Thus, any alliance that does not detail a future new product is likely to acquire the technology for potential use in future products and is therefore an early-involvement activity. On the other hand, if the press release explicitly details the use of the technology for a new product, one of two things may happen. If the partner signals that it will be continually and actively involved in the development of future products, then they are partaking in both early-involvement (for the further out products) and late-involvement (for the closer-to-release products). On the other hand, if the firm does not signal that they will be involved in future development activities beyond the current product, then they are only involved in the later stages of new product development.

As partially touched on above, the process for coding early versus late involvement is not mutually exclusive. A single strategic alliance announcement may contain aspects of both early and late involvement in the development of new products. Thus, to summarize, an alliance announcement is considered to have an aspect of early-involvement in the new product development process if they are acquiring patents with no new product specified or if they signal that they will be continually involved in new product development with their partner. If a firm only discusses an explicitly named new product that has already undergone the ideation phase, then it is classified as a late-involvement activity.

Dynamism. To calculate dynamism, we first identify the two-digit SIC code of the alliance focal industry. Industry dynamism, then, is calculated by regressing the annual two-digit SIC industry sales generated from the market over the last three years on time and then

using the standard error of the slope coefficient divided by the mean value of industry sales to obtain a standardized measure.

Control Variables. We additionally control for various confounds in our analysis. First, we control for the relationship age by using whether or not the two firms in the dyad have worked together in the past. We calculate this by analyzing both the press release of the strategic alliance announcement to find any mention of continuing a relationship with the partner, and secondly by searching for past press releases that mention any active collaboration between the two firms. We control for firm size by taking the natural log of the dyad's average total assets. Alliance scope is the sum of unique two-digit SICs to which the strategic alliance pertains. We control for alliance industry growth by regressing the annual two-digit SIC industry sales generated from the market over the last three years on time and then using the slope coefficient divided by the mean value of industry sales to obtain a standardized measure. Additionally, we use the natural log of average dyadic revenue to control for any additional on cocreated alliance value.

Model Specification

As our first study focuses on evaluating the effects of new product development on cocreated alliance value, we specify the model:

$$\begin{aligned} Cocreated\ Alliance\ Value_{kt} &= \beta_0 + \beta_1 Trust + \beta_2 Early\ Involvement + \beta_3 Late\ Involvement + \beta_4 Dynamism \\ &+ \beta_5 Trust \times Early\ Involvement + \beta_6 Trust \times Late\ Involvement \\ &+ \beta_7 Trust \times Dynamism + \beta_8 Control\ Variables + \beta_9 Year\ Fixed\ Effects \\ &+ \varepsilon_{kt} \quad (4) \end{aligned}$$

To test our hypotheses, we use multiple regression analysis with robust standard errors.

Results

We begin with a baseline model that includes only the main effects for trust, early and late involvement in NPD, industry dynamism and our control variables. Results here are largely uninteresting, with only late NPD involvement ($\beta = 0.047$; $p < 0.05$) and industry dynamism ($\beta = -0.42$; $p < 0.10$) having any significant effects. However, our model becomes substantially more interesting when we include our interaction effects into the mix.

In support of H1A, that trust contains a positive component, we find a significant main effect for trust ($\beta = 0.113$; $p < 0.10$) on cocreated alliance value. This suggests that, backing up previous literature, trust has a beneficial impact on firm financial performance. Early involvement in the NPD process has no direct impact on firm financial performance ($\beta = 0.012$; n.s.). Late involvement in the NPD process maintains a significant and positive main effect from Model 1. Specifically, we find that late involvement is associated with a direct higher impact on firm financial performance ($\beta = 0.058$; $p < 0.10$). Finally, industry dynamism has no direct impact on firm financial performance ($\beta = -0.11$; n.s.).

Looking towards our moderating effects, we find that trust has a negative and significant interaction with early involvement in the NPD process ($\beta = -0.064$; $p < 0.10$). This suggests that when firms are actively involved in the ideation process, having greater degrees of trust hurt firm financial performance. This supports our second hypothesis H2 which posits that trust will exacerbate the issues of structural rigidity and overembeddedness in the context of the front-end of innovation. This effect is directly contrasted to that of the interaction between trust and late NPD involvement, where we find no significant results ($\beta = -0.009$; n.s.). Thus, early involvement in the NPD process is

distinct from later involvement, in that the negative effects of trust are exacerbated early on, but not exacerbated significantly late in the development process. Finally, as posited, we see a negative and significant interaction between trust and industry dynamism. Specifically, we see a relatively large effect for increased dynamism exacerbating the negative components of trust ($\beta = -0.422$; $p < 0.10$). Thus, it appears that structural rigidity and overembeddedness are precluding fast responsiveness in highly dynamic industry environments.

Our results are multiple regression results are summarized in Table 1.

Insert Table 1 Near Here

Discussion

Our results are best summarized through Figure 3, which illustrates graphically the interaction between trust and NPD dynamics and industry dynamism. This graph represents whether or not an alliance is a high or low trust partnership, whether or not the involvement in the NPD process was early, late, or during both stages, and whether or not the alliance industry is not very dynamic (1 s.d. or more below the mean), of average dynamism (within 1 s.d. of the mean), or highly dynamic (1 s.d. or more above the mean).

When an alliance includes only early involvement in the NPD process, industry dynamism determines whether or not high trust is beneficial or a detriment. In the case of average dynamism, high trust is associated with a slightly negative cocreated alliance value, whereas low trust is positive, but largely insignificant. With a highly dynamic market, early involvement is associated with a great negative effect of trust.

In the case of late involvement only, we see a situation where high trust is greater than low trust, regardless of the amount of dynamism in the alliance market. In the cases

where an alliance partnership contributes more holistically to both early development activities (i.e. ideation) and late development activities (i.e. marketing and development), we see that dynamism again drives whether or not high or low trust is most important. For markets that are not very dynamic, having a high degree of trust is associated with better performance than a low degree of trust. This finding, however, flips when dynamism is moderate. In this case, low trust was found to be better than high trust which is only further exacerbated in the context of high dynamism where firm financial performance is negative for high trust partnerships and largely positive for low trust.

Insert Figure 3 Near Here

Theoretical Implications

This work has multiple theoretical implications. First, it contributes to the extant literature on trust in relationship marketing. Specifically, we show that trust may help interfirm relationships in a strategic alliance context, but that depending on the dynamics of new product development and dynamism, trust also has a dark side that may exacerbate firm performance. Second, we contribute to the literature on new product development by integrating relational antecedents into a dynamic new product process framework. Specifically, we show that depending on whether a firm is in early or late development of its new product determines the kind of alliances that it should seek. Finally, we contribute to the literature in industry dynamism and confirm that trust's negative component may be exacerbated by highly dynamic environments.

Managerial Implications

This work additional has several managerial implications. First, it suggests to us that high trust relationships are not always better than low trust relationships. As evidenced by

our results, high trust relationships can have negative impacts on performance. Managers should understand their market's dynamism and use that to determine which partners they should align with depending on the stage of development for new products. A key takeaway is that early ideation requires a great amount of external boundary spanning in the search for novel knowledge. Managers should ensure that they continue to search for new relationships to gain tacit knowledge throughout the process in highly dynamic environments. Managers should also be cognizant to avoid the effects of structural rigidity by maintaining structure on their interactions between firms.

Limitations and Future Research

This work has several limitations and directions for future enquiry. First, this study dichotomizes trust in a rather abstract manner. Ideally, we would want to operationalize trust in the first study to measure the percent overlap of the firm's alliance markets. This would give our trust measure additional power. Second, while we posit the mediators for trust's effect on firm financial performance, we do not provide any causal testing of these links. Future studies would do well to try to tease these constructs out as mediators. Third, the operationalization of NPD phase could become more rigorous. Its current incarnation has several problems of internal validity and does not offer a large amount of variance. Finally, future studies are needed to rule out other possible heterogeneity issues with certain measures such as trust.

Figure 1. Conceptual Model of the Role of Interfirm Relationships in New Product Development

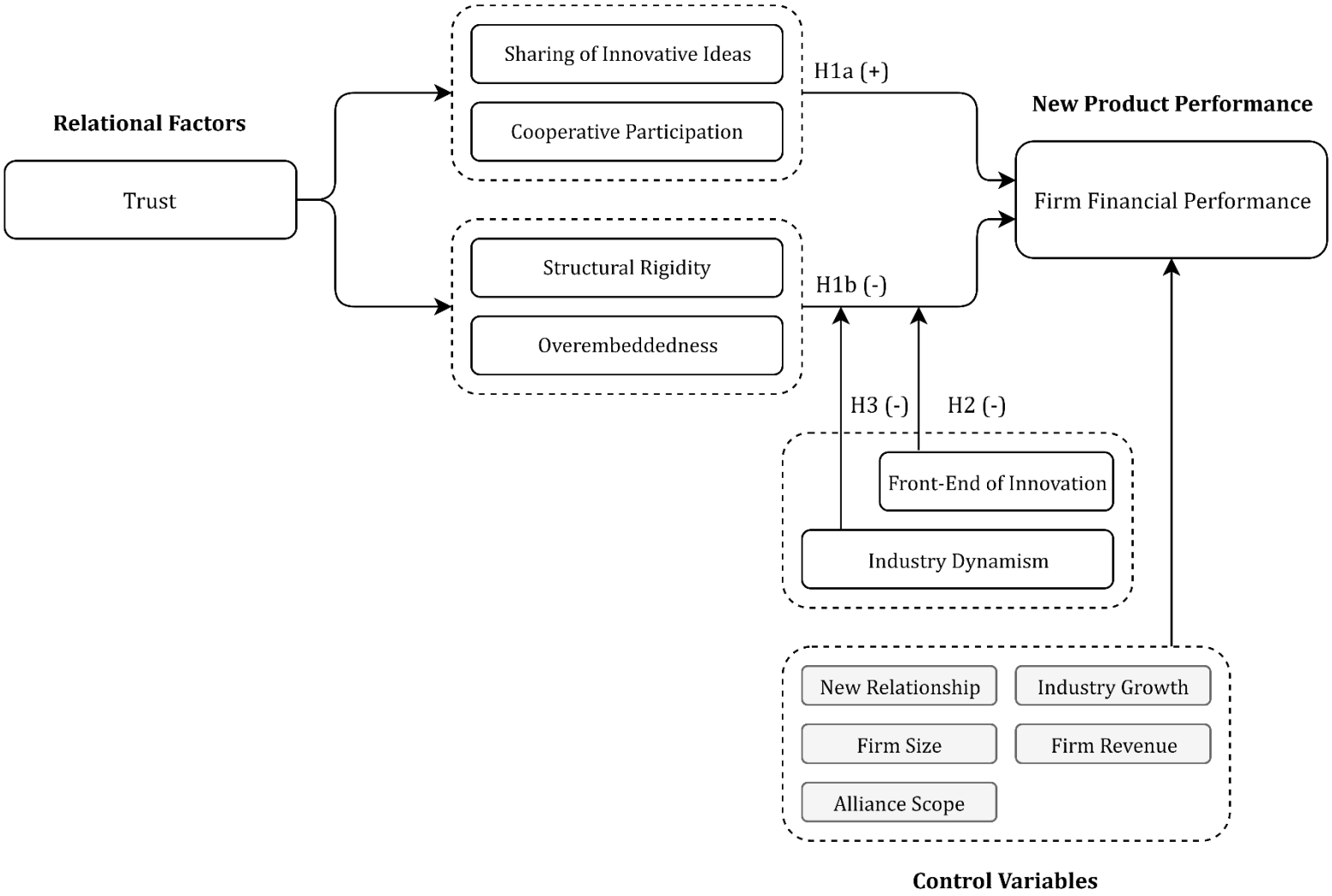


FIGURE 2

Abnormal Returns to Alliance Announcements

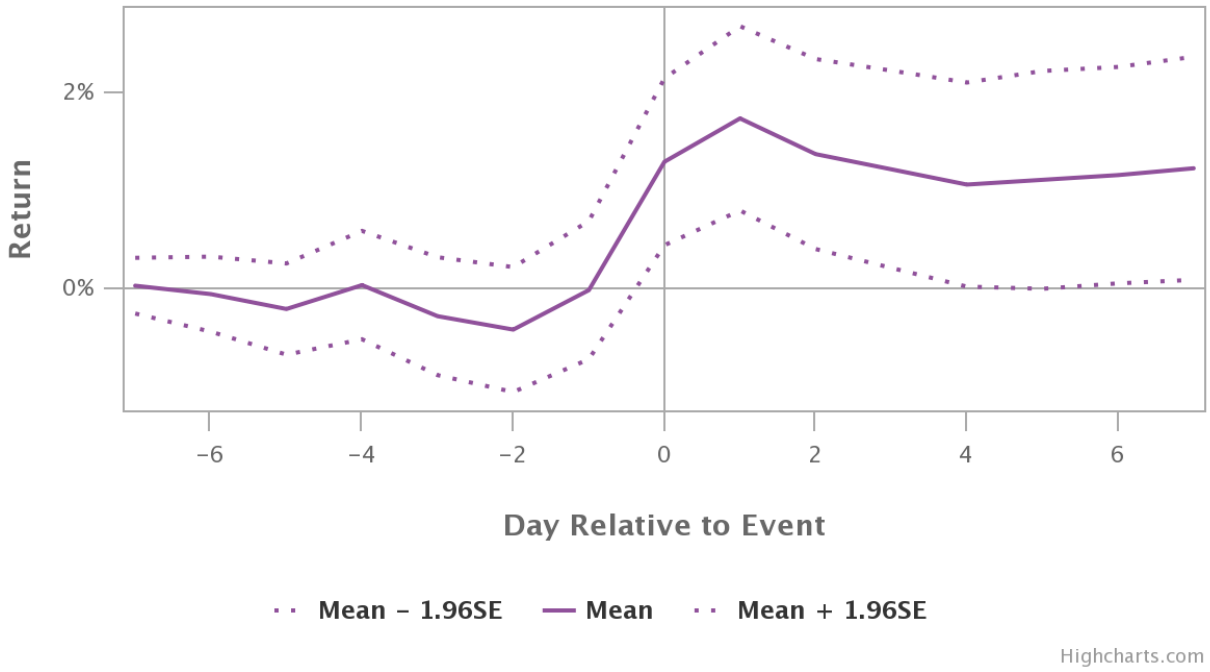
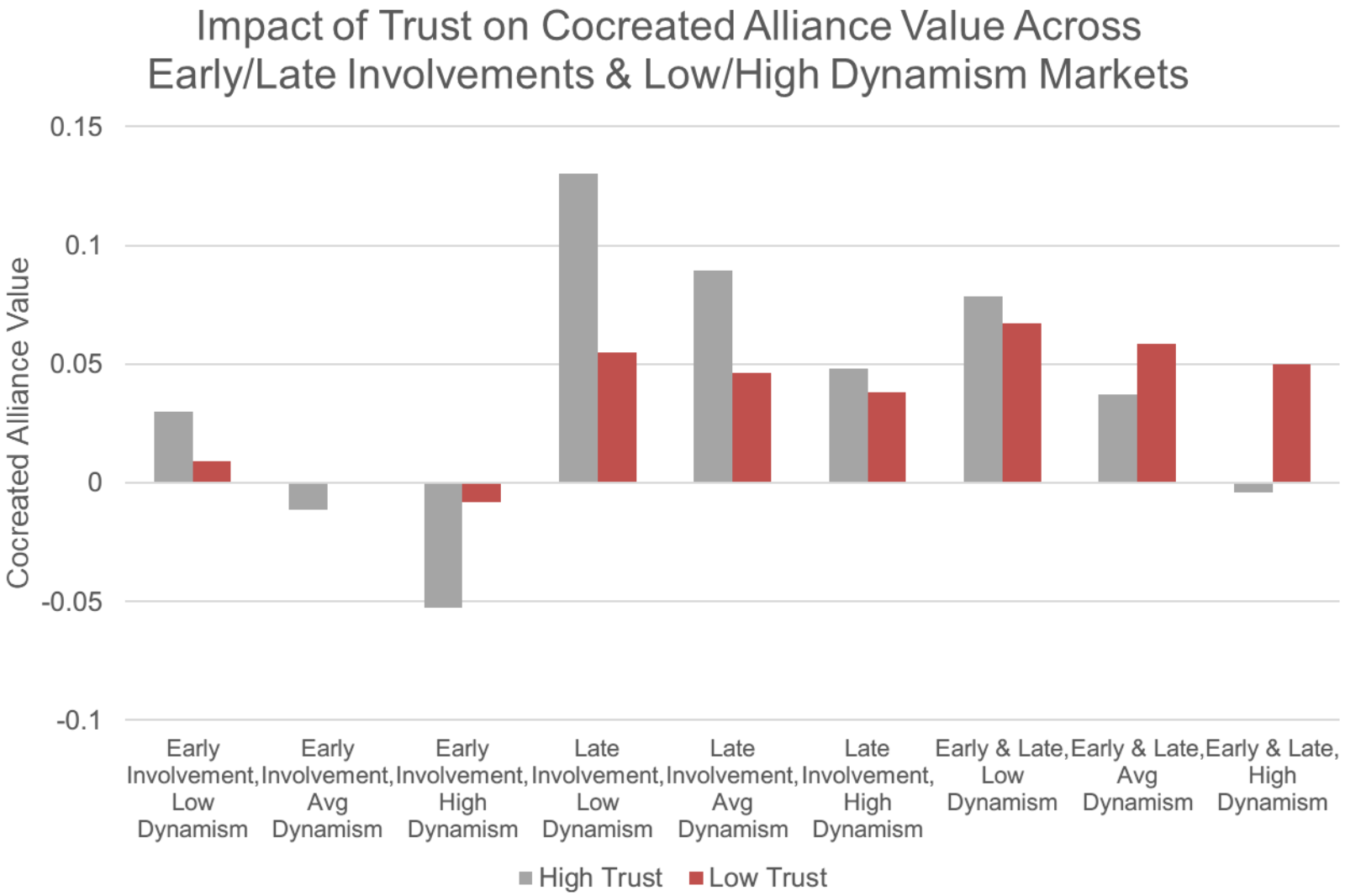


TABLE 1
Results of Event Study Analysis on Cocreated Alliance Value

Variables	Hypotheses	Model 1		Model 2	
		Coefficients	Robust Std. Errors	Coefficients	Robust Std. Errors
Main Effects					
Trust	**H1**	0.013	(0.020)	0.113*	(0.067)
Early NPD Involvement		-0.025	(0.020)	0.012	(0.032)
Late NPD Involvement		0.047**	(0.023)	0.058*	(0.029)
Industry Dynamism		-0.42*	(0.239)	-0.11	(0.262)
Interactions					
Trust × Early NPD Involvement	**H2**			-0.064*	(0.037)
Trust × Late NPD Involvement				-0.009	(0.042)
Trust × Industry Dynamism	**H3**			-0.422*	(0.236)
Controls					
Relationship Age		-0.075***	(0.021)	-0.073***	(0.020)
Firm Size		0.028	(0.022)	0.031	(0.021)
Alliance Scope		0.018	(0.013)	0.02	(0.014)
Industry Growth		0.221*	(0.117)	0.211*	(0.117)
Firm Revenue		-0.017	(0.020)	-0.021	(0.019)
Year Dummies Included		Yes		Yes	
Intercept		-0.06	(0.052)	-0.124*	(0.072)

Note : Standard errors are reported in parentheses; *p < .10, **p < .05, ***p < .01 (two-tailed hypothesis tests).

FIGURE 3
Graphical View of Interactions



References

Adler, P. S., & Kwon, S.-W. (2002). Social capital: Prospects for a new concept. *Academy of management review, 27*(1), 17-40.

Ajamian, G. M., & Koen, P. A. (2002). *Technology Stage-Gate™: a structured process for managing high-risk new technology projects*: New York: John Wiley and Sons.

Alexy, O., Criscuolo, P., & Salter, A. (2009). Does IP strategy have to cripple open innovation? *MIT Sloan Management Review, 51*(1), 71.

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

Bers, J. A., Dismukes, J. P., Mehserle, D., & Rowe, C. (2014). Extending the Stage-Gate Model to Radical Innovation-the Accelerated Radical Innovation Model. *Journal of the Knowledge Economy, 5*(4), 706-734.

Carhart, M. M. (1997). On persistence in mutual fund performance. *The journal of finance, 52*(1), 57-82.

Cohen, W. M., & Levinthal, D. A. (2000). Absorptive capacity: A new perspective on learning and innovation *Strategic Learning in a Knowledge economy* (pp. 39-67): Elsevier.

Cooper, R. G. (1990). Stage-gate systems: a new tool for managing new products. *Business horizons, 33*(3), 44-54.

Cooper, R. G. (2011). *Winning at new products: Creating value through innovation*: Basic Books.

Cooper, R. G., & Edgett, S. (2008). Ideation for product innovation: What are the best methods. *PDMA visions magazine, 1*(1), 12-17.

Cooper, R. G., & Sommer, A. F. (2016). The Agile–Stage-Gate Hybrid Model: A Promising New Approach and a New Research Opportunity. *Journal of product innovation management*.

de Brentani, U., & Reid, S. E. (2012). The fuzzy front-end of discontinuous innovation: Insights for research and management. *Journal of product innovation management, 29*(1), 70-87.

Dyer, J. H., & Chu, W. (2003). The role of trustworthiness in reducing transaction costs and improving performance: Empirical evidence from the United States, Japan, and Korea. *Organization science, 14*(1), 57-68.

Edgett, S. J. (2015). Idea-to-Launch (Stage-Gate®) Model: An Overview. *Stage-Gate International*.

Eisenhardt, K. M., & Santos, F. M. (2002). Knowledge-based view: A new theory of strategy. *Handbook of strategy and management, 1*(1), 139-164.

Fama, E. F. (1998). Market efficiency, long-term returns, and behavioral finance1. *Journal of financial economics, 49*(3), 283-306.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics, 33*(1), 3-56.

Gargiulo, M., & Benassi, M. (2000). Trapped in your own net? Network cohesion, structural holes, and the adaptation of social capital. *Organization science, 11*(2), 183-196.

Gartner Research. (2013). Market Snapshot: Customer Relationship Management, Worldwide, 2012. Retrieved from https://www.gartner.com/doc/2501215/market-snapshot-customer-relationship-management

Grabher, G. (1993). The embedded firm. *On the socio-economics of industrial networks. London and New York: Routledge*.

Grant, R. M., & Baden-Fuller, C. (2004). A knowledge accessing theory of strategic alliances. *Journal of management studies, 41*(1), 61-84.

Griffin, A. (1997). PDMA research on new product development practices: Updating trends and benchmarking best practices. *Journal of product innovation management, 14*(6), 429-458.

Hagedoorn, J., & Frankort, H. T. (2008). The gloomy side of embeddedness: The effects of overembeddedness on inter-firm partnership formation *Network strategy* (pp. 503-530): Emerald Group Publishing Limited.

Hitt, M. A., Keats, B. W., & DeMarie, S. M. (1998). Navigating in the new competitive landscape: Building strategic flexibility and competitive advantage in the 21st century. *The academy of management executive, 12*(4), 22-42.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The journal of finance, 48*(1), 65-91.

Koen, P. A., Ajamian, G., Burkart, R., Clamen, A., Davidson, J., D'Amore, R., . . . Johnson, A. (2001). Providing clarity and a common language to the "fuzzy front end". *Research-Technology Management, 44*(2), 46-55.

Koen, P. A., Bertels, H. M. J., & Kleinschmidt, E. (2014a). Managing the Front End of Innovation—Part I: Results from a Three-Year Study. *Research Technology Management, 57*(2), 34-43. doi:10.5437/08956308X5702145

Koen, P. A., Bertels, H. M. J., & Kleinschmidt, E. (2014b). Managing the Front End of Innovation—Part II: Results from a Three-Year Study. *Research-Technology Management, 57*(3), 25-35.

Kohli, A. K., & Jaworski, B. J. (1990). Market orientation: the construct, research propositions, and managerial implications. *The Journal of Marketing*, 1-18.

Kozlenkova, I. V., Samaha, S. A., & Palmatier, R. W. (2014). Resource-based theory in marketing. *Journal of the Academy of Marketing Science, 42*(1), 1-21.

Markham, S. K. (2013). The Impact of Front-End Innovation Activities on Product Performance. *Journal of product innovation management, 30*(S1), 77-92.

Markham, S. K., Ward, S. J., Aiman-Smith, L., & Kingon, A. I. (2010). The valley of death as context for role theory in product innovation. *Journal of product innovation management, 27*(3), 402-417.

McEvily, B., Perrone, V., & Zaheer, A. (2003). Trust as an organizing principle. *Organization science, 14*(1), 91-103.

Meyer, M. H., DeTore, A., Siegel, S. F., & Curley, K. F. (1992). The strategic use of expert systems for risk management in the insurance industry. *Expert Systems with Applications, 5*(1-2), 15-24.

Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of marketing*, 20-38.

OECD. (2017). *Gross domestic spending on R&D (indicator)*. Retrieved from: https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm

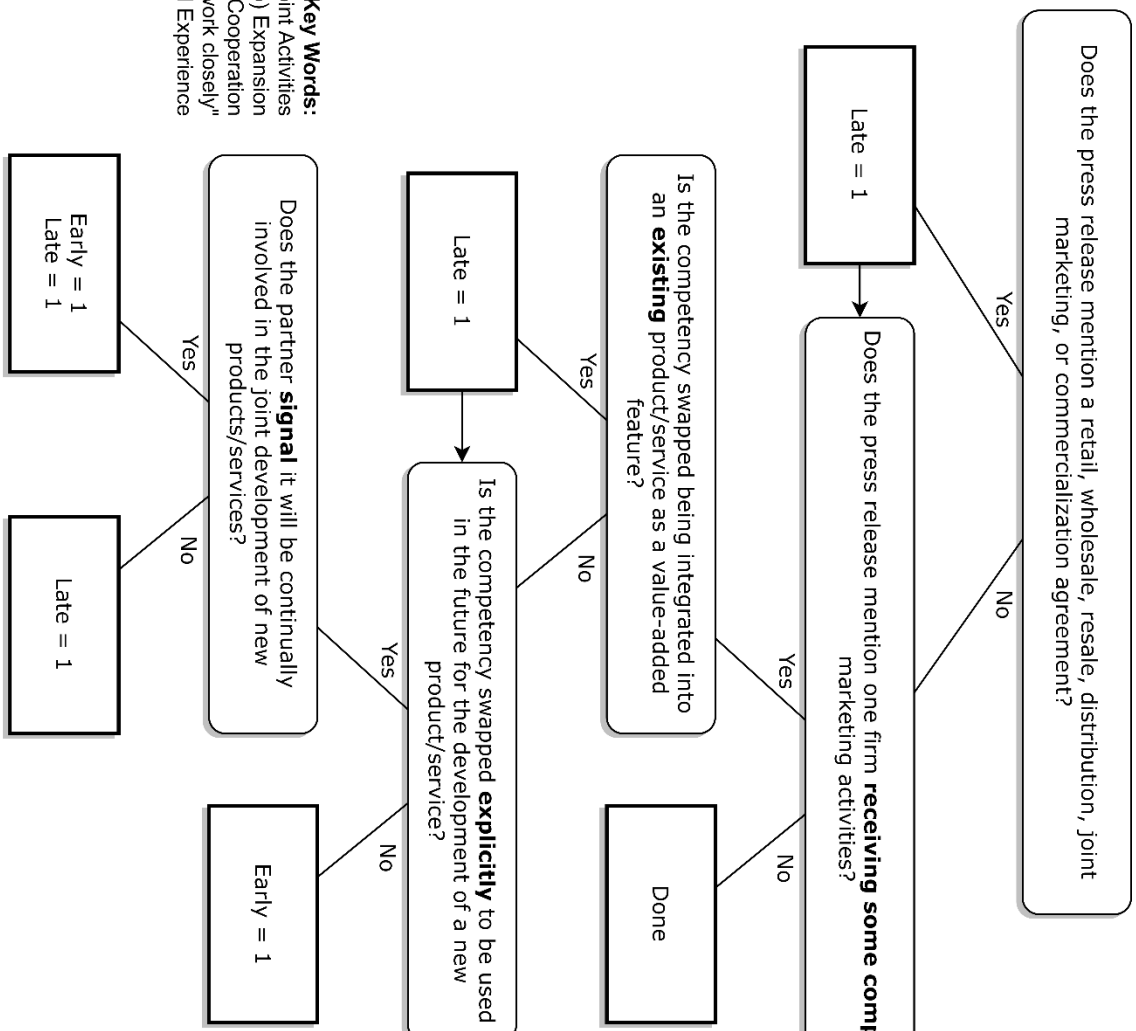
Reid, S. E., & de Brentani, U. (2004). The fuzzy front end of new product development for discontinuous innovations: A theoretical model. *Journal of product innovation management, 21*(3), 170-184.

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The journal of finance, 19*(3), 425-442.

Smith, P. G., & Reinertsen, D. G. (1992). Shortening the product development cycle. *Research-Technology Management, 35*(3), 44-49.

Zaheer, A., McEvily, B., & Perrone, V. (1998). Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization science, 9*(2), 141-159.

Appendix


Does the press release mention a retail, wholesale, resale, distribution, joint marketing, or commercialization agreement?
Yes
No
Late = 1
Does the press release mention one firm **receiving some competency** beyond marketing activities?
Yes
No
Done
Is the competency swapped being integrated into an **existing** product/service as a value-added feature?
Yes
No
Late = 1
Is the competency swapped **explicitly** to be used in the future for the development of a new product/service?
Yes
No
Early = 1
Does the partner **signal** it will be continually involved in the joint development of new products/services?
Yes
No
Early = 1
Late = 1
Late = 1
Key Words:
Joint Activities
(Relationship) Expansion
Further Cooperation
"eager to work closely"
Mentions Past Relational Experience