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Interlocking Networks: How and When Do Connections between Buying and Selling Teams Affect Customer Solutions?

Brian R. Murtha, Sundar G. Bharadwaj, and Christophe Van den Bulte

Report Summary

Many companies have turned to co-creating tailored solutions to customer problems. Doing so successfully requires involving members of both the buying and the selling firm in the process. How to organize relationships both within and across the buying and selling teams has proven to be a daunting challenge. This study investigates *how* and *when* the structure of interactions between buying and selling teams affects the development and deployment of solutions for business customers.

The authors combine insights from the literatures on buying and selling teams, customer solutions, and social network theory. The concepts of *matching ties* and *more-than-matching ties* are central to their perspective on account management and solutions marketing. Matching ties are ties *only* between counterparts with similar domains of expertise across the two firms (e.g., ties between engineers in the selling and buying firms; or between finance specialists in the two firms). More-than-matching ties, in contrast, involve pairs of individuals with similar *as well as* dissimilar domains of expertise.

Their insights are formalized into hypotheses that are put to the test in a conjoint experiment with 281 purchasing professionals, all members of the Institute for Supply Management (ISM), formerly the National Association of Purchasing Management (NAPM). Compared to retrospective studies asking respondents to evaluate their relationships and customer solutions, this experimental approach enables the authors to draw conclusions on causal effects and is less subject to *post hoc* rationalizations.

Typically, buyers associate the presence of more-than-matching ties, i.e., ties beyond those matching domain experts from each team, with less effective customer solutions. However, there are several important contingencies that reverse this effect. More-than-matching ties enhance rather inhibit the effectiveness of customer solutions when there is infrequent communication within the selling team. The positive effect is even larger when the project also requires a great deal of knowledge transfer. More-than-matching ties also amplify the positive effect of frequent interaction between the buying and selling teams when there is a very high need for knowledge transfer.

The study thus provides implications for how to structure the interactions between buy-side and sell-side teams when developing customer solutions: Use more-than-matching ties only in situations requiring a great deal of knowledge transfer, or when there is poor communication within the selling team. Such ties may also be useful when there is poor communication with the buying team, but that was not assessed in the experiment.

Brian R. Murtha is Assistant Professor of Marketing, Gatton College of Business and Economics, University of Kentucky. Sundar G. Bharadwaj is Coca-Cola Company Chair Professor of Marketing, Terry College of Business, University of Georgia. Christophe Van den Bulte is Gayfryd Steinberg Professor and Professor of Marketing, The Wharton School, University of Pennsylvania.

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Introduction

To compete effectively in the marketplace, leading companies like IBM, General Electric, Rolls-Royce, and EDS increasingly turn to co-creating tailored solutions to customer problems. Many other companies, however, find that this is not an easy act to follow (Davie, Stephenson, and Valdivieso de Uster 2010; Davies, Brady, and Hobday 2006; Johansson, Krishnamurthy, and Schlissberg 2003; Matthyssens and Vandenbempt 2008, 2010). Part of the challenge lies in how to best involve members of both the buying and the selling firm in the process (Tuli, Kohli, and Bharadwaj 2007; Ulaga and Reinartz 2011). Given the complex information requirements, both suppliers and customers tend to use teams covering multiple areas of expertise (Galbraith 2002). How to organize relationships within and across the buying and selling teams has proven to be a daunting challenge.

So, what is the most effective way for account teams on the supplier side to interact with buying teams on the customer side? The answer to this question is of great importance to business-to-business marketers of customer solutions. It also is of great theoretical interest as it involves how teams in one firm interact with teams in another firm, and hence how two *within-firm* teams interact or *interlock* to form a *between-firm* network (Van den Bulte 2010). Though the marketing literature abounds with conjectures that social network structure affects the effectiveness of account teams (e.g., Hutt and Walker 2006; Jones et al. 2005; Üstüner and Godes 2006), none have incorporated the concept of interlocking networks. Given marketing's boundary spanning and customer-facing role, understanding how internal-to-the-firm networks interact through external-to-the-firm networks is important to designing effective sales and marketing organizations.

Three key principles of account management are of particular importance here (e.g., Capon 2001; Cunningham and Homse 1986; Davie, Stephenson, and Valdivieso de Uster 2010; Jones et al. 2005). The first is to form a team consisting of people with the various domains of expertise that have to be integrated to develop and deploy a customer solution. The second is to have domain experts from one side of the buyer-seller dyad interact directly with their counterparts on the other side of the dyad. The third is that some member of the selling team, e.g., an account manager, is responsible for the coordination both within the team and between the selling team and the customer. Similar structural arrangements exist in buying teams or decision making units (Johnston and Chandler 2012). The matching of domain experts from the

two firms, the argument goes, leads to better knowledge sharing while the presence of coordinators improves the efficiency and helps to keep the project on track (e.g., Håkansson and Östberg 1975; Håkansson et al. 1979; Hutt, Johnston and Ronchetto 1985). These knowledge transfer and coordination benefits, in turn, should result in more effective customer solutions.

Current research does not give much guidance to marketers and purchasing managers struggling with how to best structure their inter-firm team interactions (Homburg, Workman, and Jensen 2002). Is the presence of "matching ties" between counterparts with similar domains of expertise in the two firms sufficient? Or are there circumstances in which buyers or sellers may actually want to go beyond them? One would expect the latter. For instance, the purchasing manager may want to keep tabs on all members of the selling team when she is concerned about poor coordination among them. But, would she always want to do so? Are there situations where intense coordination is superfluous? Maintaining a large number of contacts may be quite burdensome, expensive and inefficient—a case of "overembedded" networks—so the buyer may prefer the contacts between non-matching counterparts to be infrequent.

The new concepts of *matching ties* and *more-than-matching ties* are central to our perspective on account management and solutions marketing. Matching ties are ties *only* between counterparts with similar domains of expertise (i.e., supplier engineering-to-buyer engineering, supplier finance-to-buyer finance and so forth) across the two firms. More-than-matching ties, in contrast, involve pairs of individuals with similar *as well as* dissimilar domains of expertise[1]. From a social network perspective, a more-than-matching tie arrangement is by definition more dense than a matching-tie arrangement. However, in contrast to traditional density-increases-trust and density-increases-knowledge-transfer arguments implying a *positive* relationship between more-than-matching ties and expected solution effectiveness, the non-matching identities imply the possibility of a *negative* relationship.

We put forward and document several important contingencies. One involves the *frequency of communication within the selling team*. When it is high, each member of the team is likely to serve as an effective conduit between his matched counterpart in the buying firm and his fellow team members in the selling firm. Hence, additional non-matching lines of communication would be superfluous for knowledge transfer and possibly even

[1] In network terminology, matching ties are defined by exhibiting extreme "homophily" or "assortative mixing" with respect to domain of expertise. We ignore patterns consisting *only* of non-matching ties (i.e., ties between actors with dissimilar knowledge) because they are unlikely in practice and could be dysfunctional as well.

counterproductive—a scenario of ineffective overembeddedness. But when the members of the selling team communicate only infrequently with each other, buyers may feel that they need more-than-matching ties between teams to ensure full transfer of information between buyer and seller personnel. From a broader theoretical perspective, this would imply that within-team communication frequency (a facet of within-team tie strength) complements or interacts with the between-team network structure to impact solution effectiveness. So, the *relational* features of interaction within teams and companies would affect the value of the *structural* features of interaction across teams and companies.

Another contingency involves the *need for knowledge transfer*, i.e., the extent to which large amounts of complex information need to be shared among members of buying and selling teams for developing effective customer solutions (e.g., Zhao and Anand 2013). We find that account team structures with more-than-matching ties are effective when customer solutions require complex knowledge transfers, but *not* in other situations. Also, more-than-matching ties boost the importance of frequent between-team communications when complex knowledge needs to be transferred. These contingencies corroborate the managerial intuition that more complex solutions and unsophisticated customers require a different go-to-market approach than simpler solutions and sophisticated customers (e.g., DeBruicker and Summe 1985). These contingencies are also important theoretically because they indicate that the direction in which between-team communication frequency affects the effectiveness of between-team network structure depends on what needs to be shared along the network ties. This three-way interaction complements and nuances prior findings of two-way interactions involving tie strength and knowledge complexity (Hansen 1999; Reagans and McEvily 2003), network structure and knowledge complexity (Reagans and McEvily 2003; Rowley, Behrens, and Krackhardt 2000), and network structure and tie strength (Wuyts et al. 2004).

In summary, we bring a new perspective to solutions marketing, emphasizing that not only the pattern or network of interactions *within* the buying and selling teams but also the pattern or network *between* the teams affect solution effectiveness. Specifically, we emphasize how characteristics of intrafirm and interfirm networks moderate each other's relationship with the effectiveness of customer solutions. So, it is important to consider how intrafirm networks *interlock* to form a new network involving both intrafirm and interfirm ties. As such, we contribute to both the marketing and the social network literatures by providing new insights into

customer solutions (Tuli, Kohli, and Bharadwaj 2007; Ulaga and Reinartz 2011) and into social network issues in business marketing (Johnston and Chandler 2012; Wuyts et al. 2004), by bringing a network perspective to team selling research (Homburg, Workman, and Jensen 2002; Jones et al. 2005), and by answering the call to investigate how specific sales processes and structures can affect the quality and outcomes of inter-firm relationships (Palmatier 2008). The second contribution is to complement and extend traditional network density arguments by explicitly taking into consideration the identities of the network actors. The third contribution is to document some important contingencies, chief among them being the need for knowledge transfer. Our findings, which are based on an innovative field-based conjoint experiment with purchasing professionals, also provide useful insights to business-to-business marketing and sales managers and to purchasing managers in charge of sourcing customer solutions.

Key Concepts

Interlocking networks

Selling teams and buying teams are networks consisting of a set of individuals and the ties within them. As members of buy-side and sell-side teams interact with each other, they form an additional network involving the same set of nodes or actors but involving new interfirm ties. Hence, the two intrafirm networks are said to *interlock* through the interfirm network (Van den Bulte 2010).

Matching and more-than-matching ties

An interfirm network has matching ties (MT) when *only* counterparts with similar domains of expertise across the two firms are connected to each other. For instance, a matching tie network could consist of an IT specialist, a training specialist, and the account manager from the selling team being paired with an IT expert, a human resources specialist, and the purchasing manager from the buying team, respectively. In such a network, members from different organizations but similar functional domain expertise are connected (see Figure 1, Figures follow References throughout).

A network with more-than-matching ties (MTMT) is an interfirm network where pairs of individuals with similar domains of expertise *as well as* dissimilar domains of expertise are

connected to each other. For instance, a network with not only the same matched ties as in the previous example but also with ties between the seller's account manager and the buyer's IT specialist has more-than-matching ties (Figure 1) (e.g., Zhao and Anand 2013).

Obviously, the presence of more-than-matching ties implies a higher number of interfirm ties and hence a higher density in the network. However, the two concepts are distinct. Density is a simple count or ratio that ignores the *identity* of the actors joined through ties (e.g., Van den Bulte and Wuyts 2007). Density is affected only by the number of ties, regardless of whether they are matched or not.

Communication frequency

A central tenet of social network theory is that both the *structure* and the *strength* of ties affect the behavior and outcomes of network members. Network researchers distinguish between two dimensions of tie strength: *tie intensity*, which corresponds in most applications to frequency of interaction, and *tie valence*, which corresponds to the amount of benevolence or cooperation (Van den Bulte and Wuyts 2007). In this study, we focus on frequency only, and more specifically communication frequency. We do so for three reasons. First, the two dimensions tend to be highly correlated (e.g., Hansen 1999 reports a correlation of .83) and to have very similar effects on preferences for governance structures even when manipulated separately (Wuyts et al. 2004). Second, focusing on a single dimension keeps the factors manipulated in the research design to a manageable number. Third, frequency of interaction or tie intensity is easier to actively manage during a client engagement than tie valence.

Developing effective solutions

Our dependent variable, solution effectiveness, is the extent to which a solution meets a customer's expectations (Tuli, Kohli, and Bharadwaj 2007). Developing effective solutions typically requires that buying and selling teams work together to first define customer requirements and then design an integrated and customized solution to meet these requirements. Buyers and sellers face two key hurdles in successfully managing these processes. The first is a *requirements articulation hurdle*. It occurs because buyers often find it difficult to articulate their needs and preferences, which in turn makes it difficult for suppliers to understand customer requirements (Dhar, Menon, and Maach 2004). Articulating requirements is likely to be

especially difficult when a solution impacts several customer functions and processes (Toellner, Blut and Holzmueller 2011). The second is an *organizational landscape hurdle*. It occurs because a customer's internal political and operational landscape is not well understood by the seller and possibly not even by the customer (Tuli, Kohli, and Bharadwaj 2007). In some cases, there is uncertainty about which organizational processes the new solution will impact and how it will do so. This uncertainty fosters organizational resistance to change (Ettlie and Reza 1992; Thomke 2001). Given these two hurdles, suppliers often find it difficult to identify, access, and transfer the complex information they need in order to design, modify and integrate a solution that fits within the customer's environment.

Theory and Hypotheses

Density-based advantages of more-than-matching ties between teams

Both network theory and empirical evidence suggest that having team members connected to many people across the buying and selling firms provides greater opportunities for knowledge transfer. There are several reasons for this. Members of densely connected networks have greater access to each other and, therefore, have more opportunities to *transfer knowledge* than members of sparsely connected networks (Van den Bulte and Wuyts 2007). Because more-than-matching arrangements imply that people with different areas of expertise are connected, such arrangements may also provide better opportunities for knowledge recombination and integration. Exposure to more diverse knowledge inputs provides opportunities for team members to integrate different opinions and perspectives, which can be important in developing effective customer solutions (Tuli, Kohli, and Bharadwaj 2007).

More-than-matching ties may provide *coordination* benefits. These are often important since customer solutions typically require multiple functions of the buying and selling organization to be involved. Coordination is especially useful when different functions have competing requirements as to the design or the deployment of the solution.

Finally, more-than-matching ties may improve *monitoring* by making individual team members' behaviors more readily observable by members of the other team. This, in turn, not only attenuates opportunism but also makes it easier to publicize and reward cooperative behavior (Coleman 1988; Granovetter 2005; Van den Bulte and Wuyts 2007).

Density-based disadvantages of more-than-matching ties between teams

Obviously, adding and maintaining more ties comes at a cost. Not only does it take time away from other tasks, it may also make people less generous with their time and less diligent in their dealings with their now greater number of network contacts. Several studies have documented the deleterious effects of spreading oneself thinly over a large number of ties and of being connected to network peers who do so (e.g., Rowley, Behrens and Krackhardt 2000; Uzzi 1996).

Identity-based disadvantages of more-than-matching ties between teams

More-than-matching structures are characterized not only by higher density, but also by the presence of ties between specialist experts and generalist coordinators. The presence of ties between people with different domains of expertise and organizational affiliations raises several concerns. One is that individuals from different functional areas have different absorptive capacities, language codes, and interpretive frames (Dougherty 1992). As a result, having experts from one firm deal with a generalist or non-matched expert from another firm may result in confusion, misinterpretation, frustration, and conflict. Worse, the ensuing negative affect may even reduce the experts' ability or willingness to have open and productive discussions with their counterparts in the other company. Another concern is that non-matched individuals' inability to understand what the other firms' experts are saying or doing may limit their ability to detect opportunistic behavior (Alchian and Demsetz 1972; Wathne and Heide 2000). If so, then investing a lot of time, effort, and possibly even emotional energy in such ties may be a waste and lower rather than increase the quality of the customer solution.

How the presumed advantages and disadvantages of more-than-matches ties balance out in the end is an empirical question that has remained unanswered to date. Whereas the arguments based on density are rather equivocal, the arguments specific to more-than-matching ties between experts and generalists tend to be more negative. Since it would be premature at this stage of theoretical and empirical development to specify a directional hypothesis for the main effect of more-than-matching ties on customer solution effectiveness, we simply seek to assess whether they have any main effect:

H_1: More-than-matching ties between buying and selling teams have an effect on customer solution effectiveness.

Though existing theory and evidence does not allow one to confidently conjecture a positive or negative main effect, they do provide a stronger basis for conjecturing specific contingencies.

More-than-matching ties and communication within the selling team

Weak ties and infrequent communication impede the transfer of complex and tacit knowledge within firms (e.g., Hansen 1999; Reagans and McEvily 2003). Poor communication within a sales team may similarly deteriorate the effective transfer of knowledge with the customer and hence negatively affect the customer solution being developed. For instance, a solution is more likely to be poorly designed when the seller's IT expert does not share with his colleagues what he has learned from his counterpart in the buyer firm, than when he does share what he has learned.

Of greater substantive and theoretical interest than this main effect is how the presence of more-than-matching ties—a *structural* feature of the *interfirm* network specific to account management—moderates the effect of communication frequency within the selling team—a *relational* feature of the *intrafirm* selling network. Similar to Wuyts et al. (2004), we expect structural and relational features to act in a compensatory fashion. That is, we expect the coordination, monitoring and knowledge integration benefits of more-than-matching ties to be more important when there is poor communication within the selling team, and good communication within the selling team to be more important in the absence of more-than-matching ties.

For instance, when the members of the selling team do not interact much with each other, then the more-than-matching contacts between the purchasing manager and the various sell-side specialists will become even more important to ensure that the various sell-side specialists learn about the complete set of buy-side needs, preferences, and organizational constraints. Conversely, when selling team members are meeting frequently to discuss a customer solution, they are likely to also share with each other what they have learned from their buying team counterpart. In the latter case, more-than-matching ties between teams may end up just wasting

time and resources that could have been spent on further improving the customer solution. Hence we expect:

H_2: More-than-matching ties between buying and selling teams are more beneficial for developing effective customer solutions when there is infrequent rather than frequent communication within the selling team.

More-than-matching ties and communication between teams

Frequent interaction between buying and selling teams enhances the understanding of formal and informal roles of team members (Spekman and Johnston 1986). Such insights are particularly pertinent when developing customer solutions because that requires understanding the personnel capabilities and the political and operational landscapes of each firm (Tuli, Kohli, and Bharadwaj 2007). Prior research suggests that frequent communication between buyers and sellers facilitate the transfer of complex and tacit knowledge, lead to better products, and is favored by buyers (e.g., Uzzi and Lancaster 2003; Wuyts et al. 2004). However, complex knowledge transfer occurs mostly between experts, so the argument does not apply to more-than-matching ties. For those ties, where coordination and monitoring are the key benefits, infrequent communication is all that is needed (Rowley, Behrens and Krackhardt 2000; Wuyts et al. 2004). Frequent communication in more-than-matching ties is likely to be a waste of time and possibly even an irritant, either of which would harm the quality of the customer solution being developed. Hence, we expect:

H_3: More-than-matching ties between buying and selling teams are more beneficial for developing effective customer solutions when there is infrequent rather than frequent communication between the teams.

Communication frequency within the selling team and between teams

Because developing an effective customer solution requires identifying and combining knowledge on both sides of the buyer-seller dyad, we expect frequent communication within the selling team and between the selling and buying teams to reinforce each other. Specifically, frequent communication between teams should make discussions within the selling team more

informed about customer requirements and procedures, and so enhance the beneficial effect of such within-team communication. Similarly, the more the members of the selling team are keenly aware and updated of their own colleagues' thinking, the more the project will benefit from frequent interactions with the customer. Since the evidence for such "concatenated" communication frequency effects in interlocking vertical networks is still very rare (Wuyts et al. 2004), we explicitly test for them in our study:

H_4: Frequent communication between the buying and selling team makes frequent communication within the selling team more beneficial for developing effective customer solutions, and vice versa.

Need for knowledge transfer as a key contingency

Both the importance of coordination and monitoring and the importance of the gap in knowledge in more-than-matching ties are likely to increase with the amount and complexity of the knowledge that needs to be shared (e.g., Zhao and Anand 2013). The same holds for the importance of frequent communication within and across organizations (Wuyts et. al 2004). We therefore also assess how the *need for knowledge transfer*, i.e., the extent to which large amounts of complex information need to be shared among members of buying and selling teams, impacts our four prior hypotheses.

Although the net balance between advantages and disadvantages of more-than-matching ties is an empirical question (H_1), one would expect the balance to move farther in the direction of benefits as the need to transfer knowledge increases. The value of having more ties providing opportunities for knowledge transfer increases with the need for such transfers. Coordinating the various experts on both sides of the corporate dyad increases with the need to integrate various people's knowledge, skill, and experience. In short, one would expect more-than-matching ties to benefit customer solutions more when the need for knowledge transfer is very high. This would support the practice of using complex account team arrangements mostly in such situations.

H_5: More-than-matching ties between the buying and selling team have a more positive effect on developing effective customer solutions as the need for knowledge transfer increases.

The benefits of more-than-matching ties between teams under high need for knowledge transfer are likely to be even larger when there is frequent communication between the teams. The reason is that having non-experts from one firm interact more frequently with experts from the other firm allows them to identify more opportunities where the project would benefit from bringing different kinds of experts together from both firms. In network-theoretical terms, when the need for complex knowledge transfer between teams is high, then more-than-matching ties are useful not only for monitoring (requiring only infrequent communication) but also for transferring and recombining various types of knowledge (requiring frequent communication). For instance, account and purchasing managers need to use their more-than-matching ties to domain experts (IT, human resources, finance, …) only infrequently for "tertius gaudens" monitoring benefits (Burt 1992) but need to do so frequently for "tertius iungens" benefits of finding new opportunities to combine areas of expertise (Obstfeld 2005) and to help transfer complex knowledge (Hansen 1999).

H_6: More-than-matching ties have a more positive effect as the need for knowledge transfer increases, and especially so if those ties are used frequently.

Like Wuyts et al. (2004) argued persuasively but did not document, we expect the benefits of "concatenated" communication frequency effects in interlocking networks to be especially pronounced when the need for complex knowledge transfer is high. Hence:

H_7: Frequent communication between the teams makes frequent communication within the selling team more beneficial for developing effective customer solutions, and vice versa, and especially so when the need for knowledge transfer is high.

Our second hypothesis is that more-than-matching ties are more beneficial for developing effective customer solutions when there is infrequent rather than frequent communication within the selling team. The rationale was that structural and relational features act in a compensatory fashion. We see no compelling reason to expect that the substitution pattern would be more or

less pronounced depending on the need for knowledge transfer. So, we do not expect the presence of such a third-order interaction:

H_8: More-than-matching ties between teams are more beneficial when there is infrequent rather than frequent communication within the selling team, and are so *regardless* of the need for knowledge transfer.

Method

Research design

We use a ratings-based conjoint experiment with purchasing professionals to test our hypotheses. Such a design has several benefits as noted by Wathne, Biong, and Heide (2001) and Wuyts et al. (2004). It enables one to draw conclusions on causal effects; it can provide multiple measurements per respondent, which increases statistical power and enables one to control for unobserved heterogeneity; it is less subject to *post hoc* rationalizations than a retrospective study asking respondents to evaluate their relationships and customer solutions; and high internal validity need not come at the detriment of contextual realism.

We manipulate three independent variables, each at two levels: (1) the presence vs. absence of more-than-matching ties, (2) frequent vs. infrequent communication between the selling and buying teams, and (3) frequent vs. infrequent communication within the selling team. Recent qualitative research suggests that buyer-seller interactions are necessary to build the capabilities required for successful solutions (Ulaga and Reinartz 2011). Thus, the dependent variable is the buying firm's assessment of the extent to which the interaction within and between the two firms will result in the timely design and development of an effective solution. This assessment should be critical when deciding which vendor to use, and so of great relevance to marketers. To the extent that these assessments are based on actual experience, they should also be informative about the actual effectiveness of various network structures. Because Wuyts et al. (2004) suggest that the effect of network structure might vary across stages of the integration process, we check to what extent our findings apply to the design and development phase as well as the deployment phase.

These manipulations result in a 2^3 (network profiles) x 2 (phases) full factorial design in which no main effects, two-way interactions or three-way interactions are aliased (confounded) with any other main effects, two-way interactions or three-way interactions (Box and Draper 1987). We first had participants rate eight profiles for solution development, and then eight profiles for solution deployment, randomizing the order of specific profiles within each series of eight to avoid order artifacts. Pretests indicated that eliciting a response to these eight profiles each presented twice was not overly time-consuming or burdensome to the study participants. Since particular combinations of the relevant network attributes are difficult to convey succinctly in words, we conveyed the information in both textual and pictorial format. Figure 2 shows the network pictures used and Table 1 presents the instructions given to participants on how to interpret the network pictures (Tables and Figures follow References throughout). Table 2 reports the wording used for rating the effectiveness of the solution. It also provides the verbal description that we included with each of the eight graphs (scenarios) in Figure 2. The picture-based design was crafted to eliminate confounds from demographic traits of network members such as age, gender, or race (Williams and O'Reilly 1998).

Scenario description

The scenario is that of a purchasing manager working with his/her own team members as well as selling team members in the acquisition of a complex IT solution. Participants were instructed to see themselves in the role of a purchasing manager for their firm who is involved in acquiring an integrated computer network solution consisting of hardware (e.g., server, workstations, routers, switches, access points) and software (e.g., network operating system, network security software, application software). The cover story further noted that "This purchasing task requires that you include your functional and technical specialists in the solution process. It also requires that your buying team works with members of the selling team to develop and implement an effective systems solution on time." We chose this context and scenario because it is similar to that used by Wuyts et al. (2004) and is consistent with theory-in-use exemplars described by Tuli, Kohli, and Bharadwaj (2007) and Ulaga and Reinartz (2011).

We make three assumptions about the network (see Figure 2). First, all within-team members communicate at least infrequently with one another. It is extremely unlikely that team members from the same team would not communicate with each other during such a complex

project. Second, all communication ties *within* each team are of the same frequency, and that all communication ties *between* the buying and the selling team are of the same frequency. This avoids an inordinate number of network structures within and between the teams making the experiment intractable. Third, there is high communication frequency within the buying team, again to be realistic and prevent the experiment from becoming too time-consuming and cumbersome for the respondents.

Pretesting

The instrument underwent two rounds of pre-testing. It was first reviewed by three academics, six PhD candidates across management disciplines, and eighteen MBA students. Their extensive feedback led to a revised version which was pretested among six practitioners having significant experience with purchasing complex IT solutions. The two pretests led to significant changes in the description of the buying situation, the text-based description of network attributes, the picture-based illustration of network attributes, and the wording of the ratings questions. Pretest participants indicated that the pictures were very helpful to understanding the scenarios.

Data collection

Members of seven different chapters of the Institute for Supply Management (ISM), formerly the National Association of Purchasing Management (NAPM), were contacted on our behalf by their local chapter head. Like other marketing researchers before us, we deemed ISM members to be a particularly appropriate population in which to test our hypotheses because they tend to be actively involved with purchasing and supply management issues (e.g., DeSarbo, Ramaswamy, and Chatterjee 1995; Perrone, Zaheer, and McEvily 2003; Scheer, Miao, and Garrett 2010; Wang et al. 2008). The request to participate was sent by email and included a link to a website featuring the conjoint task. This email included an endorsement of the head of the local chapter as well as a pledge to donate $25 to one of three charities of the participant's choice for his or her participation in the study (Habitat for Humanity, Save the Children, American Cancer Society). A reminder email was sent approximately one week after the initial email. In total, 281 professionals participated in our conjoint experiment. As reported below, the conjoint parameter estimates and substantive conclusions are robust to variations in the time at which

people participated in the study, providing no indication of harmful self-selection into the experiment.

Measured covariates

We measure the need for knowledge transfer among members of the buying and selling teams using a 10-point, two-item scale, for each stage separately (Table 3). On average, participants noted that the need for knowledge transfer (NKT) was high, both during the development stage (7.63) and the deployment stage (7.11)[2]. We mean-center each scale, so the lower-order effects of the variables that NKT interacts with can be interpreted as average or main effects.

We also collected measures of our study participants' years of work experience and their familiarity with acquiring integrated systems solutions, which is not a frequent event. Following Kumar, Stern, and Anderson (1993), we asked participants to report the extent to which they were familiar, knowledgeable, and had been involved with purchasing integrated systems solutions (IT or other), and combined the three items into a single scale ($\alpha = .95$).

Table 4 reports the basic descriptive statistics for the measured quantities. Our participants had, on average, more than 20 years of work experience in general and adequate experience with buying integrated systems solutions specifically.

Statistical analysis

Since we use a within-subject experimental design, we have repeated observations on the same study participants. We therefore use mixed-effects linear modeling which allows us to control for unobserved heterogeneity using random effects in both the intercept and slopes. Let subscript *i* denote a respondent, s denote a project stage (*s*: 1,2), and *j* denote a rating task or profile within a stage (*j*: 1, …, 8). Also, let x_0 denote the intercept, let x_k denote the *k*-th regressor for $k > 0$, and let $D1_s$ and $D2_s$ indicate whether the rating is for stage 1 ($D1_s = 1$, $D2_s = 0$) or stage 2 ($D1_s = 0$, $D2_s = 1$). We test our hypotheses using both a simple and a more complex specification.

The first model we use to explain preference scores y_{sij} is:

[2] This is consistent with expectations for designing and deploying effective customer solutions (Tuli, Kohli and Bharadwaj 2007; Wuyts et al. 2004).

$$y_{sij} = \Sigma_k (\beta_k + U_{ki}) x_{kij} + \varepsilon_{sij}, \quad (1)$$

where

$\varepsilon_{sij} \sim N(0, \sigma_s^2)$, Corr $(\varepsilon_{1ij}, \varepsilon_{2ij}) = \rho$,

$U_{ki} \sim N(0, \tau_k^2)$.

In this model, the β coefficients correspond to the average effects across stages. These are the effects of substantive interest. We use (-1/+1) effects coding for the three manipulated factors and mean-center the NKT scale, so all effects can be interpreted as average effects even in the presence of significant higher-order interactions. We allow the effects to vary randomly across study participants using normally distributed random effects (U), and also allow for the error term to be correlated across stages (ρ). We use a variance components structure where the random effects are independent from each other. As Wuyts et al. (2004) note, random effects not only capture heterogeneity in preferences and the resulting dependence in errors, but also allow for conditional heteroscedasticity and control for possible differences in how respondents interpret the conjoint attribute levels. We estimated the model using standard maximum likelihood.

We also estimate a more complex model where both the coefficients of substantive interest and their random effects are allowed to vary across stages:

$$y_{sij} = \Sigma_k \beta_k x_{kij} + \Sigma_k \gamma_k (D2_s - D1_s) x_{kij} + \Sigma_s \Sigma_k (U_{1ki} * D1_s + U_{2ki} * D2_s) x_{kij} + \varepsilon_{sij}, \quad (2)$$

where

$\varepsilon_{sij} \sim N(0, \sigma_s^2)$, Corr $(\varepsilon_{1ij}, \varepsilon_{2ij}) = \rho$,

$U_{ski} \sim N(0, \tau_{sk}^2)$, Corr $(U_{1ki}, U_{2ki}) = \phi_k$.

In this model, the β coefficients again correspond to the average effects of interest, the γ coefficients correspond to contrasts between stages, and the U_{ski} terms are individual-specific and stage-specific random effects. Note, $(D2_s - D1_s)$ is -1 for development and +1 for deployment, and so acts as an effects-coded variable. As a result, the β coefficients of key interest are still average effects across stages.

Results

Tests of hypotheses

Table 5 presents the results from the main analysis based on 281 respondents rating 4495 profiles (one respondent rated only 7 of the 8 development profiles) using the simpler of the two models. As indicated by the pseudo-R^2, computed as the square of the Pearson correlation between actual and predicted ratings, the model fits quite well. The presence of more-than-matching ties is, on average, associated with less rather than more effective customer solutions (Hypothesis 1). However, such ties are not harmful when the members of the selling team interact infrequently, a contrast predicted in Hypothesis 2. Frequent interaction between the selling and buying teams, however, does not moderate the effect of more-than-matching ties—at least on average. So, Hypothesis 3 is not supported. Frequent interaction both within the selling team and between the selling and buying teams is associated with more effective customer solutions. These two effects mutually reinforce each other, as indicated by the positive interaction effect supporting Hypothesis 4.

As expected, the need for knowledge transfer (NKT) moderates the association of relational and structural network characteristics with solution effectiveness. Specifically, the negative effect of more-than-matching ties on solution effectiveness is tempered when there is high NKT, supporting Hypothesis 5. More specifically, the effect turns from negative to positive once NKT is 1.54 (.096/.062) points above the mean. Exactly 25% of the observations are above this cut-off. So, more-than-matching ties improve effectiveness for projects in the upper quartile of the NKT distribution.

Hypothesis 6 is supported as well. The higher the need for knowledge transfer, the better it is to have both frequent and more-than-matching ties between the buying and selling team. This implies that deleterious cross-team overembeddedness is less likely to occur when the need for knowledge transfer is high. Along similar lines, Hypothesis 7 is supported as well: the joint presence of frequent interaction within and between the teams is especially effective when the need for knowledge transfer is high.

Finally, as expected, we cannot reject the null for Hypothesis 8. This means that Hypothesis 2 is robust to changes in the need for knowledge transfer. That is, the relationship between more-than-matching ties and solution effectiveness is particularly positive when selling

team members interact infrequently with each other, and this holds regardless of the need for complex knowledge transfer. Still, more-than-matching ties boost rather than hurt solution effectiveness when there is both a high need to transfer knowledge and infrequent communication within the selling team. The coefficients in Table 5 imply that the expected effect of MTMT on effectiveness is then -.096 + (-1)(-118) + (1)(.062) + (-1)(.007) = .077 > 0.

Table 6 reports the results for the more complex model allowing the coefficients and the random effects vary across the development and deployment stages. Though this more flexible specification fits the data better, the hypothesis tests and even the associated effect sizes reported in Table 5 are remarkably similar. The β values of the main effects in Tables 5 and 6 are nearly identical. This indicates that allowing the random effects to vary across stages does not affect the effects of substantive interest. More importantly, the γ cross-stage contrasts in the hypothesized effects of substantive interest in Table 6 are always much smaller than their associated β main effect. This indicates that, even when the contrast is statistically significant, the stage-specific effects are not very different from one another. In short, having the coefficients and the random effects vary across stages does not affect any of the substantive conclusions.

Robustness checks

Since we use a within-subject experimental design with only one measured covariate (NKT), omitted variable bias is not much of a concern. However, it is possible that not all variation in professionals' preferences for particular network structures is captured in our model. We therefore conducted two robustness checks.

We checked for the possibility of selectivity bias in our hypothesis tests by allowing all 14 coefficients in Table 5 to vary as a function of the time at which people participated in the experiment (mean-centered). Adding the 14 interaction terms did not improve the model fit significantly (Δ -2LL = 21.0, $p > .05$) and did not affect the pseudo-R^2. The only coefficient of substantive and theoretical interest to be moderated ($p < .05$) was that pertaining to Hypothesis 6. More specifically, the interaction was absent for those in the top 8.9% in response time. As an additional check for selectivity, we regressed each of the measured covariates in Table 4 on response time. None varied significantly with response time ($p > .05$).

We also performed a robustness check for years of work experience (mean-centered). Adding 14 interaction terms to the main model re-estimated for the 279 participants who

reported their years of work experience again did not improve the model fit significantly ($p > .05$). The only coefficient to be significantly moderated ($p < .05$) was the intercept. The effectiveness ratings increased by .013 per year of experience. None of the coefficients of substantive interest were moderated.

Discussion

We investigated how specific patterns of relationships within selling teams and between buying and selling teams affect purchasing professionals' expectations about the effectiveness of customer solutions. To this end, we not only leveraged existing theoretical insights on how relational and structural characteristics foster coordination and knowledge transfer (e.g., Hansen 1999; Obstfeld 2005; Wuyts et al. 2004; Wuyts and Van den Bulte 2012) but also introduced the notion of more-than-matching ties, i.e., ties between members of the buying and the selling team who have different areas of expertise in their respective organizations. Before discussing the theoretical contributions and managerial implications of our work, we provide a summary of the key findings.

The presence of more-than-matching ties, is associated—on average—with less rather than more effective customer solutions. However, more-than-matching ties do boost the effectiveness of customer solutions when there is infrequent communication among members of the selling team. Also, frequent interaction between the buying and selling teams is especially productive when there is also frequent interaction within the selling team.

The need for knowledge transfer markedly affects whether those conclusions hold or not. Specifically, the negative effect of more-than-matching ties on solution effectiveness is tempered when the need to transfer knowledge is high. When there is both a high need to transfer knowledge and poor communication within the selling team, then more-than-matching ties appear to serve as a substitute and boost rather than hurt solution effectiveness. They also do so when there is both a high need to transfer knowledge and frequent interaction between the buying and selling teams. Finally, a greater need for knowledge transfer also amplifies the positive interaction between frequent communication within and between teams. In short, the need to share large amounts of complex knowledge among members of buying and selling teams greatly impacts whether a pattern of more-than-matching ties is beneficial, and it affects the extent to which concatenating strong ties within and across teams are beneficial.

Contributions to theory and research

Interlocking marketing networks. Our study highlights the effects of *interlocking* networks at the supplier-customer interface. People in each firm interact with their immediate colleagues, forming a network of intrafirm ties. They also interact with people in the other firm, creating a network of interfirm ties. Since the same people are members of their respective intrafirm network and the joint interfirm network, the latter interlocks the former two. Our findings show that the advantages of one type of network depend on the relational and structural characteristics of the other. The concept of *interlocking* networks is relevant not only for buying and selling customer solutions, our focus here. It also is useful for other marketing contexts and decisions. Very recent work by Peres and Van den Bulte (2014), for instance, shows that the interlock between vertical networks of commercial seller-buyer ties and the horizontal network of word-of-mouth ties among buyers affects the profitability of product exclusivity decisions.

Identity in marketing networks. Our study also introduces the concepts of *matching* ties and *more-than-matching* ties, which allows us to apply a network-theoretical perspective to an important issue in the areas of team and solutions selling, business marketing, and relationship marketing (e.g., Håkansson 1982; Jones et al. 2005; Palmatier 2008; Wuyts and Van den Bulte 2012). The literatures on industrial buying and on team selling have long emphasized the need to consider the various roles of the people involved. Role and identity within networks, in contrast, have long remained very abstract notions the practical relevance of which has remained difficult to grasp (e.g., Nadel 1957; Van den Bulte 2010; White 1992). By introducing the concepts of matching and more-than-matching ties, we highlight the importance of the *identity* of network actors to matters of network structure and do so in a way that is immediately relevant to industrial buying and team selling. This is an area where marketing scholars are in a unique position to make contributions to network research.

Network structure and market knowledge transfer. We document that the need for knowledge transfer affects not just the benefits of particular network configurations but also the occurrence of dysfunctional overembeddedness in customer solution development and business-to-business buying. This extends the key insight of Rowley, Behrens, and Krackhardt (2000) to the customer-supplier interface of central interest to marketing. Prior work by Hansen (1999), Szulanski (1996) and Szulanski, Cappetta and Jensen (2004) has shown that strong ties characterized by frequent interaction facilitate intra-company transfer of complex information.

Our study documents that the same holds for cross-company transfer during customer solution development and deployment. It also documents that knowledge complexity affects not only the benefits from the strength of the ties (relational embeddedness) but also those from the pattern of the ties (structural embeddedness). This is the first empirical validation of an important notion introduced as an assumption by Wuyts et al. (2004).

Structure and tie strength in marketing networks. We find that structural and relational network features act in a compensatory fashion. Our findings suggest that the coordination, monitoring and knowledge integration benefits of more-than-matching ties between the buying and selling teams are especially beneficial when there is infrequent communication within the selling team, and that frequent communication within the selling team is more beneficial in the absence of more-than-matching ties with the buying team. Also, we find that concatenations of high-frequency personal intrafirm ties with high-frequency personal interfirm ties improve customer solutions. This extends the findings by Wuyts et al. (2004) in a channels context for complex B2B products where all the nodes were organizations and all the ties were across organizations. While prior work has noted how effective customer solutions depend on both buyer and supplier characteristics (Tuli, Kohli, and Bharadwaj 2007), we find that they also depend on how teams within the two interact with one another. Future research on the effectiveness of buying teams (buying centers) or selling teams (account teams) may want to consider how teams on *both* sides of the corporate dyad interact both *internally* and *externally* with each other. The mutual dependency between effective internal and external modes of interaction will also be of interest to innovation and new product development researchers.

Managerial implications

Companies are increasingly offering customized solutions, yet many have encountered difficulties in making this strategy work. Our findings provide insights into how and when to build connections between buyer and seller teams in order to develop and deploy solutions successfully.

With regard to the *how* or nature of connections, sales and account managers will welcome the evidence that business customers associate better solutions with (i) frequent interactions between matching members of the buying and selling teams and (ii) frequent interaction within the selling team. Managers should encourage their account team members to

let customers know that they have frequent meetings and discussions among themselves. Customers, our results show, interpret this as a sign that the selling team is more likely to develop and deploy an effective customer solution.

However, simply building more ties between supplier and buyer teams, especially more-than-matching ties, need *not* increase the effectiveness of customer solutions. Customers typically associate such ties with less rather than more effective solutions, especially when the selling team members already interact frequently with each other or there is great need to transfer complex knowledge. In such cases, companies may realize not only greater efficiency but also create greater customer value by limiting the interfirm interactions to matching ties. This insight contrasts with typical prescriptions of building many interconnections between vendors and customers, but is consistent with more nuanced recommendations based on contingency arguments (DeBruicker and Summe 1985; Matthyssens and Van den Bulte 1994) and recent research on customer participation (Fang 2008).

The results also help identify instances *when* managers should build and use more-than-matching ties with their customers. The first arises when there is ineffective communication within the selling team—because they are geographically dispersed, for instance, limiting rich face-to-face interaction critical for complex knowledge transfer. In such situations, account managers and other members of the team should develop ties with multiple members of the buying team and not just with their counterpart.

The second instance occurs when a large amount of complex information needs to be transferred between the buying and selling teams. In such cases, purchasing managers do not see more-than-matching ties are wasteful. Rather, such ties are likely to provide greater access to multiple viewpoints and opportunities for information transfer (Van den Bulte and Wuyts 2007). Such access may also help articulating customer requirements and jointly resolving multiple technological, commercial or administrative challenges (Tuli, Kohli, and Bharadwaj 2007). Thus, when solutions are more routine in nature, managers should consider using only matching ties; however, as the complexity and knowledge requirements of the customer solution increases, managers should consider structuring the interfirm relationships with a more-than-matching tie arrangement.

Limitations and future research directions

As with all research, the present study has some limitations that future work may want to address. First, our conjoint experiment measured perceptions of solution development and deployment effectiveness. Though value as perceived by customers is critical to marketing success, it would be useful to complement the present research using objective metrics of delivered value.

Second, because adding more-than-matching ties tends to increase the density of interfirm networks, these two distinct constructs often go hand-in-hand in practice. Researchers interested more in disambiguating subtle causal mechanisms than in studying situations realistically mirroring business practice may want to identify alternative ways to more sharply separate more-than-matching ties from density.

Third, it would be valuable to assess the benefits of having between-team network structures combining strong matching ties facilitating knowledge transfer between experts with weak non-matching ties facilitating progress tracking and problem detection (i.e., a mix of strong and weak ties). This configuration may offer the best combination of the benefits of each type of tie in team selling situations (Van den Bulte and Wuyts 2007).

Fourth, the conjoint scenarios in our study limited counterpart experts to have mirror-image portfolios of ties. It is conceivable that, based on personal power considerations, purchasing managers may prefer to be able to get in touch directly with many members of the selling team without the account manager being able to similarly deal with many buyer employees directly. Given our research objectives, we controlled for such power considerations by using a symmetric design, but it may be worthwhile for future research to explicitly assess whether and how power considerations lead to a preference for asymmetric network configurations.

Finally, solution effectiveness can mean very different things to buyers and sellers (Tuli, Kohli, and Bharadwaj 2007) and each may put different weights on various benefits (e.g., those of monitoring to safeguard against opportunism). Hence, it could be of interest to conduct a study similar to ours from both the seller's and the buyer's perspective. All these extensions may further enrich our understanding of when and how interlocking networks and more-than-matching ties help improve the development of effective customer solutions.

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Table 1
INSTRUCTIONS ON HOW TO INTERPRET THE NETWORK GRAPHS

Selling team members:	**Buying team members:**
Person 1 is the key salesperson assigned to your firm. S/he has a general base of knowledge, but often relies on his/her experts.	Person A is the purchasing manager for your firm. **YOU** are the purchasing manager.
Person 2 is an industry expert (i.e., s/he is an expert in the industry you are in).	Person B is your industry expert (i.e., s/he is an expert in the industry you are in).
Person 3 is a technical specialist (i.e., s/he knows everything there is to know about IT configurations).	Person C is your technical specialist (i.e., s/he knows everything there is to know about IT configurations).

The lines connecting the people in the diagram reflect who interacts with whom. Whether the line is full or broken reflects how often they interact.

———A solid line between any two people means that they communicate with each other frequently. By frequently, we mean at least several times per week.

- - - - - A dashed line between any two people means that they communicate with each other very infrequently. By infrequently, we mean only a few times per month.

Table 2
DEPENDENT VARIABLE AND TEXT-BASED CONJOINT ATTRIBUTE LEVELS

Dependent Variable: Solution Effectiveness

To what extent will this pattern of interaction within and between teams result in the timely [design/development] [deployment] of an effective solution that meets your firm's expectations?

Very unlikely									Very likely
1	2	3	4	5	6	7	8	9	10

Manipulated Attributes and Their Levels

1. Communication frequency within the selling team (Within)	+1: Within the selling team, members communicate with each other several times per week
	-1: Within the selling team, members communicate with each other only a few times per month
2. Communication frequency between the buying and selling teams (Between)	+1: Members of your buying team communicate several times per week with those members of the selling team that they are connected to
	-1: Members of your buying team communicate only a few times per month with those members of the selling team that they are connected to
3. Matching and more-than-matching ties between the buying and selling teams (MTMT)	+1: There are 7 linkages between members of your team and members of the selling team
	-1: There are 3 linkages between members of your team and members of the selling team

Note: The words in parentheses in the instructions for rating the solution's effectiveness pertain to the different stages of the process.

Table 3
MEASUREMENT SCALES

Need for knowledge transfer during development (N = 281; Mean = 7.63; SD = 2.17)
(1=strongly disagree to 10=strongly agree; 2 items; Cronbach α = 0.78)

Need for knowledge transfer during deployment (N = 281; Mean = 7.11; SD = 2.03)
(1=strongly disagree to 10=strongly agree; 2 items; Cronbach α = 0.75)

During the [design/development] [deployment] of an integrated and customized computer network solution…
… large amounts of information need to be shared among members of buying and selling teams.
… complex information needs to be shared among members of buying and selling teams.

Familiarity with integrated systems solutions (N = 281; Mean = 5.64; SD = 2.60)
(1 = strongly disagree to 10 = strongly agree; 3 items; Cronbach α = 0.95)

I am familiar with purchasing integrated systems solutions (IT or other).
I am knowledgeable about purchasing integrated systems solutions (IT or other).
I have been involved in purchasing integrated systems solutions (IT or other).

Work experience in years (N = 279; Mean = 21.7; SD = 10.6)

Table 4
DESCRIPTIVE STATISTICS

	Mean	SD	Correlations		
			1	2	3
1. Familiarity with integrated systems solutions	5.64	2.60			
2. Work experience in years	21.67	10.63	.19		
3. Need for knowledge transfer during development	7.63	2.17	.05	.17	
4. Need for knowledge transfer during deployment	7.11	2.03	.17	.14	.34

Note: Work experience is measured for 279 participants; all other variables are measured for all 281 participants. All correlations of .14 or higher are significant at 5%.

Table 5
MAIN RESULTS

Effect	Hypothesis	Coeff	Standard error
Average effects (β)			
Intercept		5.425***	.060
MTMT	H_1	-.096*	.044
Within		.516***	.029
Between		.936***	.047
MTMT * Within	H_2	-.118***	.023
MTMT * Between	H_3	-.033 ns	.027
Within * Between	H_4	.173***	.023
NKT		.000 ns	.018
NKT * MTMT	H_5	.062***	.015
NKT * Within		.030*	.012
NKT * Between		.046**	.016
NKT * MTMT* Within	H_8	.007 ns	.010
NKT * MTMT* Between	H_6	.025*	.011
NKT * Within * Between	H_7	.036***	.010

Error correlation across stages (ρ) = -.02

-2 LL = 17,521.8
Pseudo-R^2 = .745

ns $p > .05$.
* $p \leq .05$.
** $p \leq .01$.
*** $p \leq .001$.

MTMT = More-than-matching ties between the selling and buying teams (-1/+1)
Within = Communication frequency within the selling team (-1/+1)
Between = Communication frequency between the selling and buying teams (-1/+1)
NKT = Need for knowledge transfer (scale)

Table 6
RESULTS ARE ROBUST ACROSS STAGES

		Average effect (β)		Difference (γ)	
Effect	**Hypothesis**	**Coeff**	**St. error**	**Coeff**	**St. error**
Intercept		5.411***	.060	.075**	.026
MTMT	H_1	-.096*	.044	-.004 ^{ns}	.022
Within		.520***	.029	-.051**	.019
Between		.936***	.047	.025 ^{ns}	.024
MTMT * Within	H_2	-.115***	.023	-.018 ^{ns}	.018
MTMT * Between	H_3	-.036 ^{ns}	.027	.023 ^{ns}	.018
Within * Between	H_4	.167***	.023	.022 ^{ns}	.017
NKT		-.000 ^{ns}	.018	.028*	.014
NKT * MTMT	H_5	.062***	.015	.003 ^{ns}	.012
NKT * Within		.029*	.012	-.027**	.010
NKT * Between		.047**	.016	.023 ^{ns}	.013
NKT * MTMT* Within	H_8	.006 ^{ns}	.010	.016 ^{ns}	.009
NKT * MTMT* Between	H_6	.024*	.011	.011 ^{ns}	.009
NKT * Within * Between	H_7	.035***	.010	.004 ^{ns}	.009

Error correlation across stages (ρ) = .31

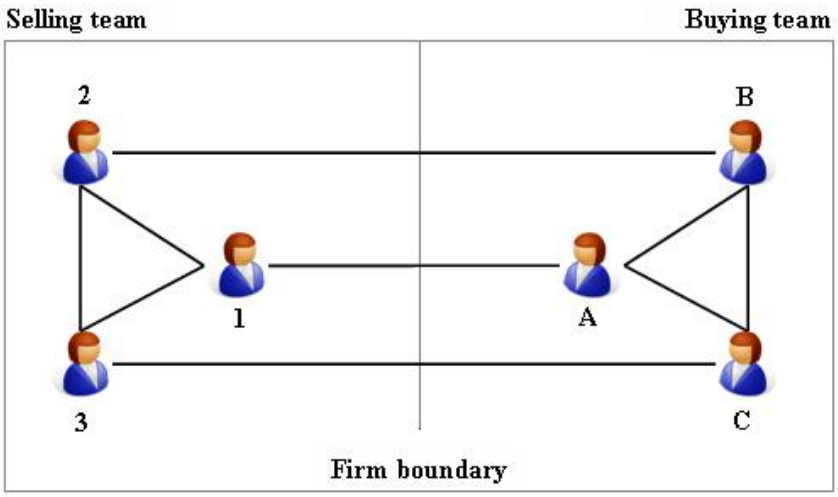
-2 LL = 17,327.3
Pseudo-R^2 = .879

^{ns} $p > .05$.
* $p \leq .05$.
** $p \leq .01$.
*** $p \leq .001$.

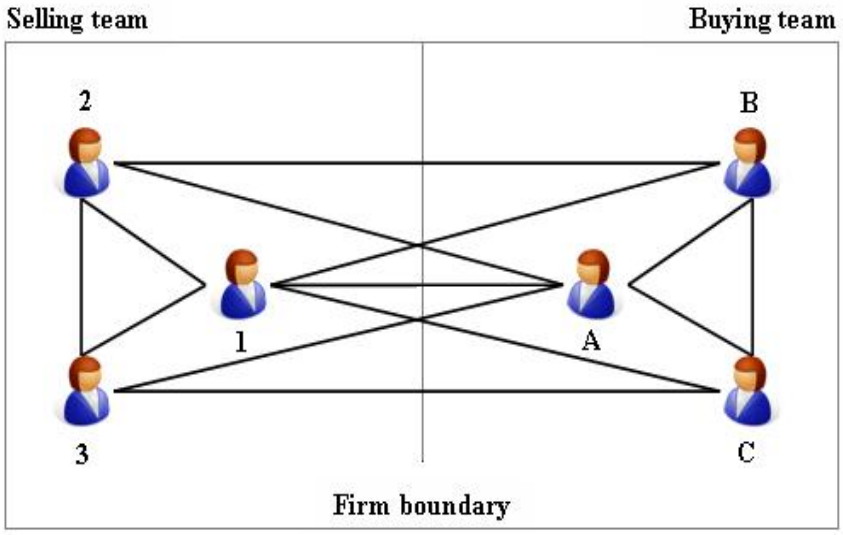
MTMT = More-than-matching ties between the selling and buying teams (-1/+1)
Within = Communication frequency within the selling team (-1/+1)
Between = Communication frequency between the selling and buying teams (-1/+1)
NKT = Need for knowledge transfer (scale)

Figure 1
MATCHING AND MORE-THAN-MATCHING TIES BETWEEN TEAMS

Matching ties between teams:

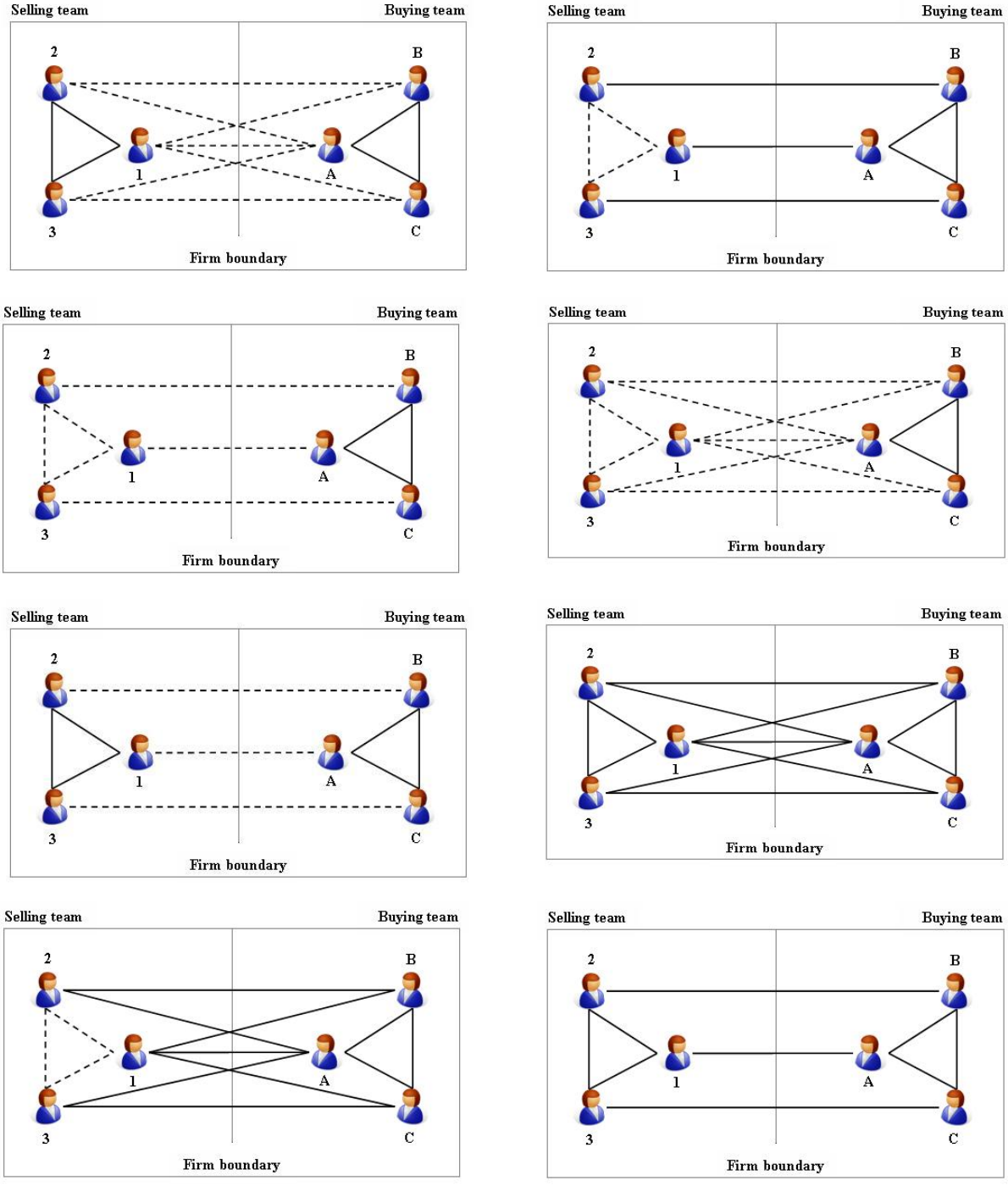


More-than-matching ties between teams:



Note: The numbers and letters indicate the areas of expertise of the team members (e.g., 1/A = team coordinator, 2/B = IT, 3/C = finance).

Figure 2
GRAPHICAL DEPICTION OF NETWORK STRUCTURE IN CONJOINT SCENARIOS



Notes: Dashed lines indicate infrequent interactions whereas solid lines indicate frequent interaction. Table 1 reports the verbal instructions given to study participants.